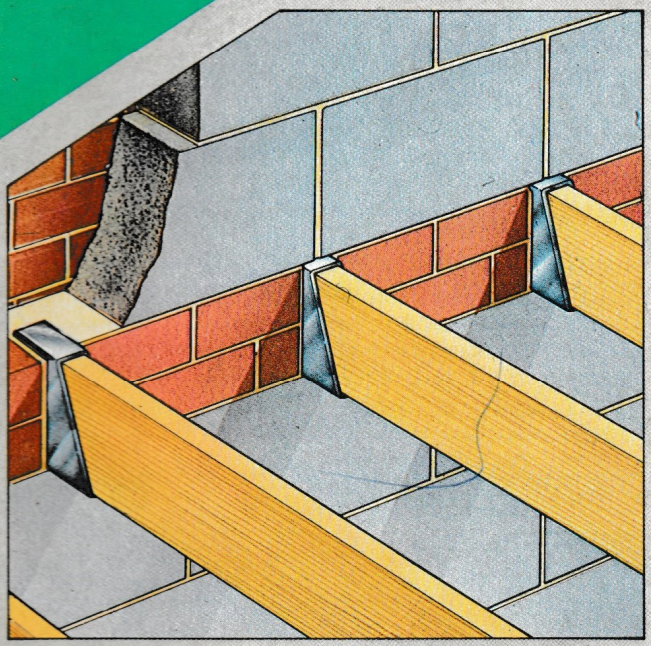
A Marshall Cavendish Publication in weekly parts

Part 7

THE KNACK

The complete manual of DIY skills, projects and home ideas



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THE KNACK

Contents Part 7

Home designer

Storage ideas 177

Project: Flexible cube storage

How to make space for an expanding family

Repairs and renovations

Fixing floorboards 182

A guide to making good those annoying creaks and cracks

Project

Space-saving hi-fi unit 188

An attractive corner cabinet to keep your hi-fi out of harm's way

Plumbing course 4

Bending copper pipe 194

Project: Using flexible pipe

Step-by-step through another important plumbing technique

Decorating course 4

Papering ceilings 200

Project: Liven up your ceilings

How to hang paper on the ceiling without getting in a mess

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Storage ideas

Elizabeth Whiting

Creating storage space in small flats and houses can be a real problem. The trick is to use dead space in halls, living rooms and bedrooms to house custom-built storage units

Above: *Try turning the bed around and build a bedhead and combined storage unit. Siting the shelves in the middle of the room means easy access for all*

A practical and sensible approach to storage will do more to create a sense of space and order in your home than any number of furnishing or decorating tricks. If everything has its own place, it is much easier to keep a home tidy and, therefore, more spacious and less cluttered.

The most suitable storage for any home depends on various factors: the size of the space available, whether you want your storage system to be a permanent fixture or something you can take with you when you move, how much you want to spend and whether you want all your possessions and ornaments on show or stored out of sight in cupboards.

You also need to consider how the shape of a room might be changed by built-in cupboards or units and whether, in fact, you need several different systems for different parts of the house. Take a good look at your home and see which rooms always seem to be overflowing, then decide which system would be most likely to benefit each room.

In a small house or flat the best way to create space is to have as much of the storage as possible flat against the wall so there is very little clutter in the middle of the room. If the rooms are very small, you can give the impression of more space by using the same kind of storage system throughout the house. Alternatively, consider using unusual, space-saving storage.

Built-in cupboards

Whether you are altering the storage system in your present home or considering requirements for a new one, built-in cupboards are undoubtably one of the best space-savers. In recesses or against walls and old fireplaces, they merge well with the other walls rather than standing out.

Built-in cupboards from floor to ceiling provide a great deal of storage space and can be built in various combinations of hanging space, shelves and cupboards.

For a bedroom, you need plenty of hanging space for clothes plus shelves or cupboards above to store more bulky items like spare blankets, eiderdowns and suitcases.

Elizabeth Whiting

Above: *Most kitchens are so cluttered it is often forgotten there is plenty of storage space—beneath the ceiling*

Storage units

Moveable storage units made up of shelves and cupboards are one of the most versatile storage systems and can be free-standing or wall-mounted. If they are made up of free-standing cubes they can be re-arranged in different ways whenever and wherever you want.

You can avoid having every single storage feature flat against the wall by using storage units as room dividers. The shelves are open on both sides which means that anything stored on them is accessible from either side.

Alternatively, you can use a storeage unit as an island in the middle of the room. If the room is large enough it can go right up to the ceiling, providing plenty of space for things like televisions, hi-fi and records at the bottom and books and ornaments higher up.

Some units can be used as desks or worktops, coffee or magazine tables, drawer units, shelf units and cupboards with doors. In other systems, desks fold up and drawers slide into the space underneath. Build up a variety of units along one wall rather than having them dotted all around a room. This way you get plenty of storage without having to occupy a vast amount of floor space. Also, you can choose whether to have your possessions on show on shelves or hidden away in cupboards.

For a whole wall of units, choose those that are simply designed with doors that fit properly and surfaces which are easy to clean. Avoid fancy mouldings and a lot of contrasting colours—you may find you get tired of them or that the unit clashes with a new colour scheme when you want to redecorate.

Shelves

These are the cheapest and most versatile of all storage systems. They can hold a great deal without taking up a lot of floor space and because everything is visible, you do not have to hunt around in a cupboard to find what you want.

Fit shelves of different sizes and strengths depending on the load they are to carry. Before putting up shelves for such items as books or heavy kitchen equipment, check that the wall in question is strong enough to support them. Also, make sure that no electricity or gas pipes run anywhere near the shelf support points which are drilled into the wall.

A wide variety of proprietary shelving units are available, some of them free-standing and some with metal brackets supporting the shelves which can be adjusted to any height you care to have them.

Storage for children

Children hate to see any of their belongings thrown away so the only hope of keeping their rooms tidy is to provide plenty of space for them.

If children's rooms are to have built-in or fitted cupboards, handles must be reachable and both doors and drawers easy to open. Toys can be stored in large plastic rubbish bins—much easier than struggling to open drawers or doors—or in a locker underneath a built-in window seat, bed, sofa or cupboard.

Make full use of the wall space by putting up a large sheet of pegboard—painted a cheerful colour—with lots of hooks on it. You can then hang small items which might otherwise get lost in the bottom of a bin. Alternatively, make a rag-bag tidier from lots of pockets made from old pieces of material. Sew them onto a piece of canvas and hang it on the wall.

Bunk beds are very good space savers in a children's bedroom. They can be separated into single beds later and some are available with a box storage space underneath. Beds that slide one under the other provide another good idea for either a child's room or a spare room.

When you plan a storage system for children remember that they grow very quickly and their needs change. Small cupboards and drawers with ducks on may be fine for a two year old but a five year old will have developed all sorts of interests and hobbies which need floor space during the day and easy-to-reach cupboards to store them in when not in use.

There is no need to waste the space at the bottom of the hanging area of a cupboard. You can use it to store shoes in plastic covered wire baskets—supported on a metal frame inside the unit. Avoid dust traps on the tops of cupboards by having built-in cupboards right up to the ceiling. You can always keep things that are not in constant use at the top of the cupboard.

When planning built-in cupboards, avoid making them too shallow—particularly if you are building into a recess. It is better to have the cupboard jutting out a little than ending

up with shelves that are too narrow to take the things you intended to store on them.

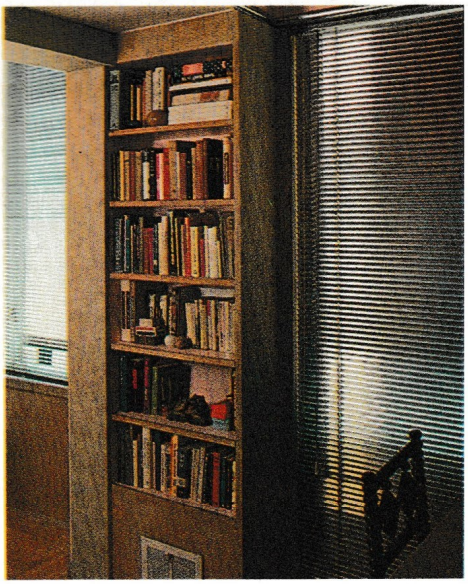
Large areas of wall-to-wall cupboard will begin to look dull unless they are broken up by the occasional recess with a mirror or picture. Mirror-finish sliding doors from floor to ceiling have a similar effect and the reflections give a feeling of space.

Large built-in cupboards can end up with a lot of doors. If you feel there are going to be too many consider fitting a single folding door. These run on special tracks at the top and bottom of the cupboard.

Fitted cupboards

If you are planning to move within a few years and do not want to leave all your cupboards behind, you can install fitted cupboards. These are usually screwed into the wall or floor but are not part of the structure of the building in the way that built-in cupboards are. They can simply be unscrewed and taken away when you go. Many ready-made units or kits are easily available.

Below: *If your kids scribble on the walls hide their graffiti—and the TV—behind closed doors*



Above: *Use that dead space between two tall windows to build an elegant set of ornament shelves or a bookcase*

Other space savers

Above-ceiling space in a house with a pitched roof is an ideal place for storage. In old houses with high ceilings long term storage space can be created by installing false ceilings with storage space above.

A cupboard under the stairs is always a useful storage space. If you have not got an existing cupboard, it is quite a simple matter to build one from hardboard. It makes a good storing place for sports or cleaning equipment. If there is room put in some shelves and hooks as well.

Before you start

Draw a scale plan of your rooms before you actually start installing any storage system. Draw in the main features such as windows, beds, sinks and tables and the proposed storage. You can check that you are leaving enough clear space in the middle of the room and that your storage is going to be in the most useful place—you do not want to find that the saucepan cupboard is on the opposite side of the kitchen from the stove.

Remember, too, that the storage system you are installing will be there for a long time. And because belongings always grow, while storage space does not, it is worth allowing for quite a bit more than you think you need at the time.

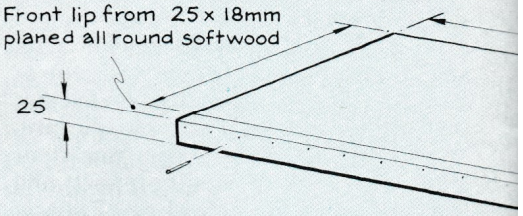
Below: *No possible storage space is wasted in this tiny bedroom, yet it still has a spacious feel*

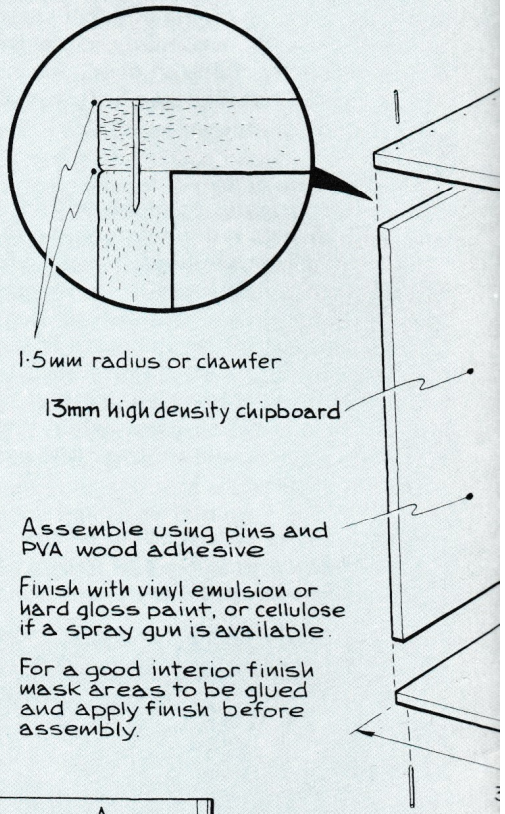
Elizabeth Whiting

Flexible cube storage

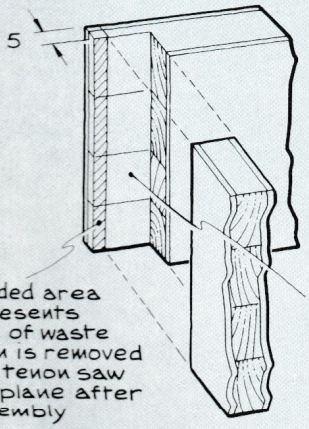
The free-standing cube is an extremely versatile storage unit all around the house. Apart from being easy to make and combining well with other cubes to form novel shapes, it is attractive and simple. Use the cubes again and again, repainting if necessary to accommodate the colour schemes of different rooms. They need not have a hinged door nor even a plinth on which to stand and you can make them any size you like. The dimensions given will build the cubes shown in the pictures which are 300 x 300 x 300mm.

Gavin Cochrane




1·5mm radius or chamfer
13mm high density chipboard
Assemble using pins and PVA wood adhesive
Finish with vinyl emulsion or hard gloss paint, or cellulose if a spray gun is available.
For a good interior finish mask areas to be glued and apply finish before assembly.

Making the plinth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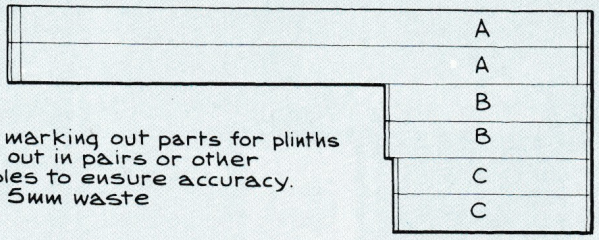
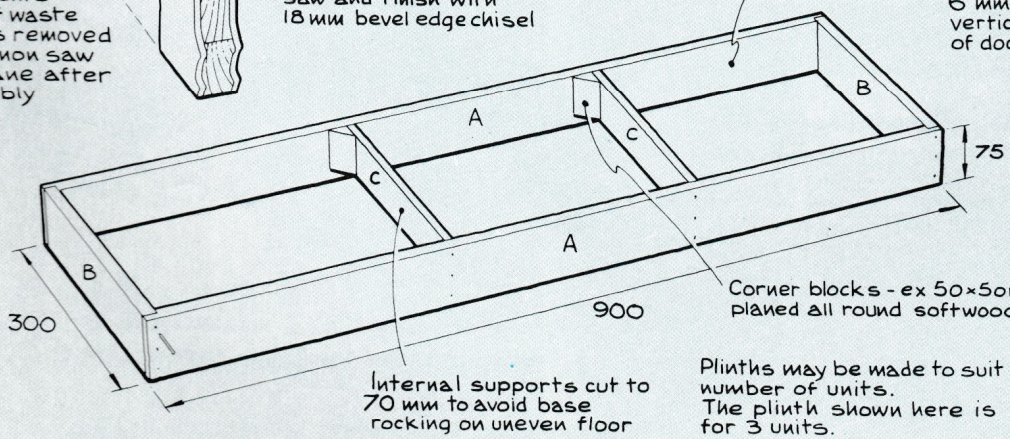
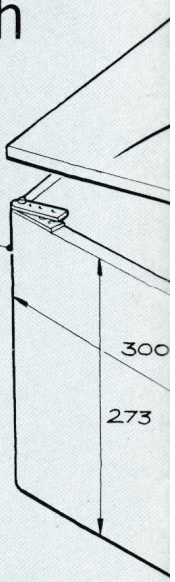
Shaded area represents 5mm of waste which is removed with tenon saw and plane after assembly
Cut open housing with tenon saw and finish with 18mm bevel edge chisel



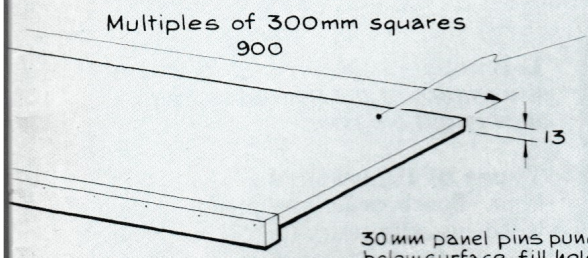




Plinths may be made to suit any number of units. The plinth shown here is for 3 units.

Advertising Arts

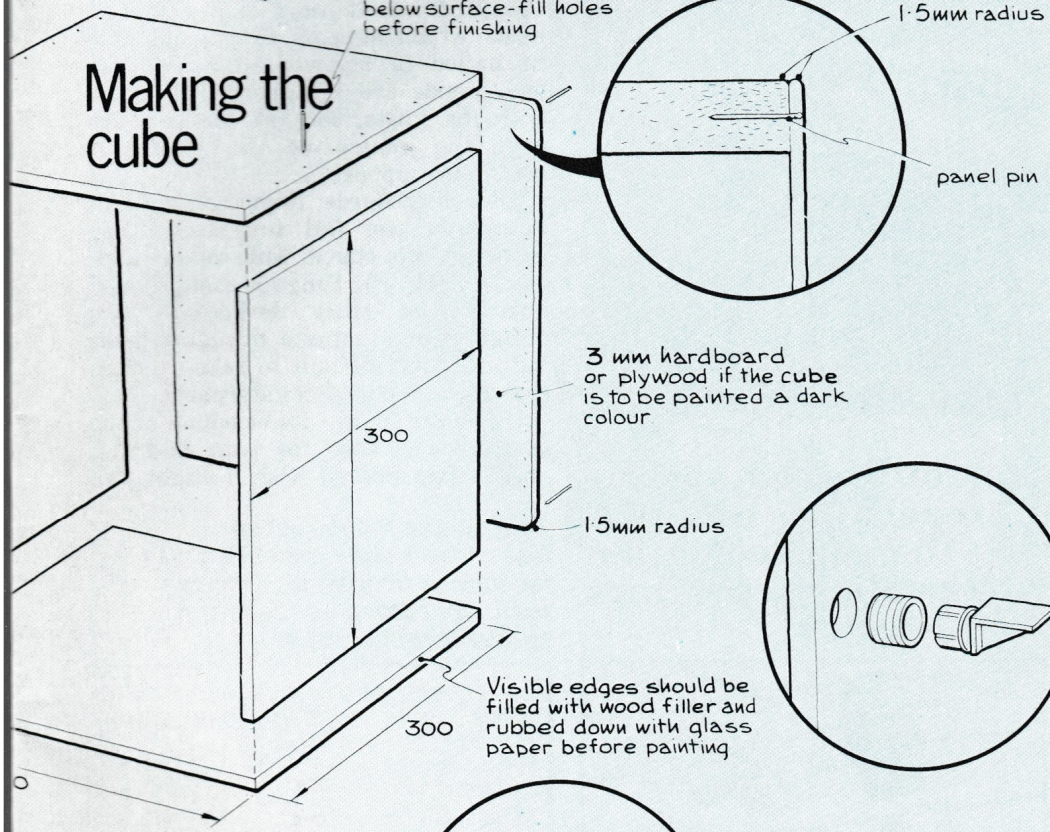
Making the cube

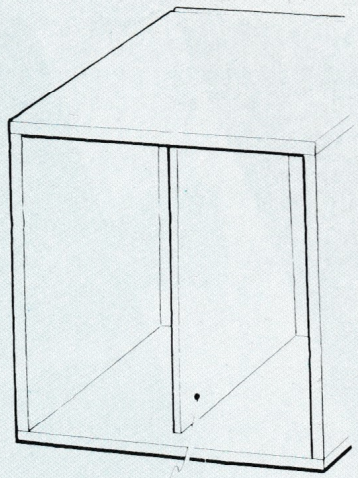


A top may be used to tie several cubes together by screwing through the top of the cubes into the underside of the top.

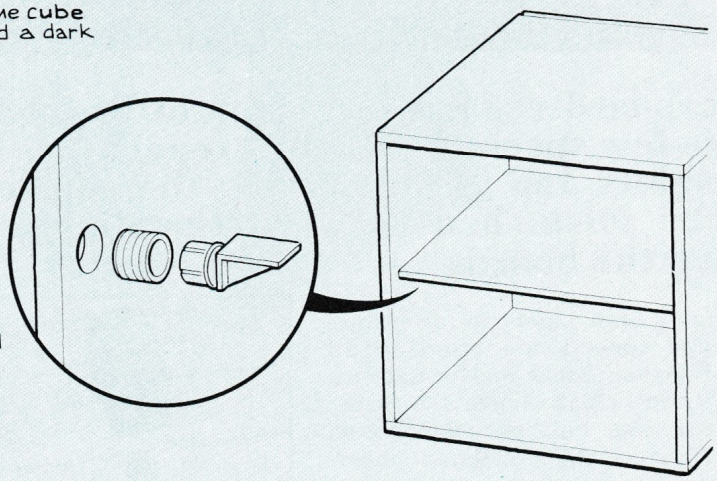
The front lipping may be glued and cramped in preference to pinning. After glue has set trim front edge with fine set plane.

To avoid warping, paint both top and underside.

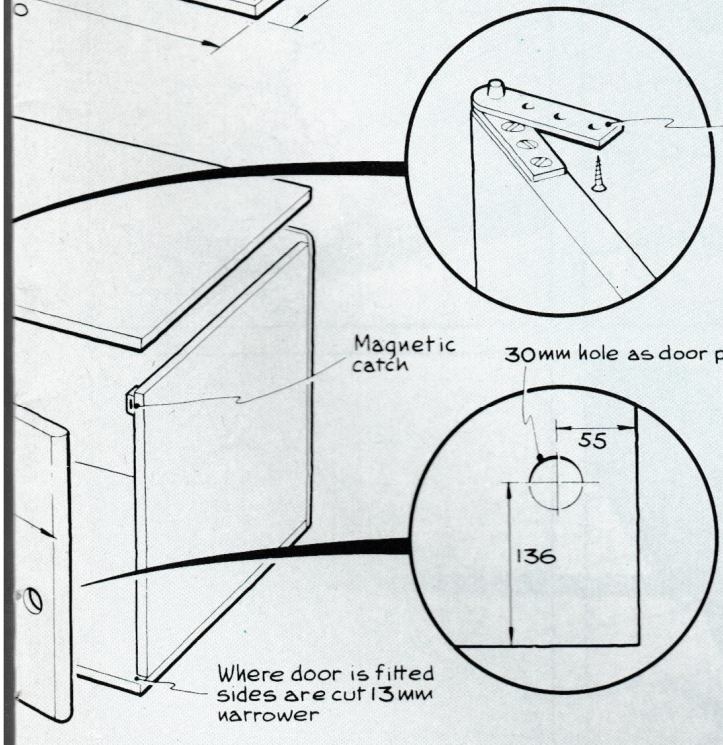

30 mm panel pins punched below surface-fill holes before finishing
1·5mm radius
panel pin
3 mm hardboard or plywood if the cube is to be painted a dark colour
300
1·5mm radius
300
Visible edges should be filled with wood filler and rubbed down with glass paper before painting



Simply fix vertical dividers with extra strong glue (cut dividers to be a tight fit)



Shelves may be fitted using shelf support studs



Fixing floorboards

Left: *Use a strip of wood to protect the surface of the floorboards when prising out old nails*

Floorboard repairs are straightforward and require few special tools. But repairs are essential for safety and for preserving the good condition of the joists beneath and the floor coverings above the boards

Although solid and hardwearing, floorboard timbers are prone to all sorts of minor faults and irritations. For instance, creaks under the carpet are annoying but not dangerous; rotten boards which collapse underfoot can be dangerous as well as annoying. Even if your floorboarding is in perfect condition, it may still need work to improve draughtproofing—or to get to piping and wiring underneath.

Problems with floorboarding are most likely to occur near to walls and piping, particularly in situations where underfloor ventilation is inadequate. Certain types of wood-rot fungi which occur in association with brick and stone can prove very costly if not treated in the early stages. Prod boards and skirtings with a penknife blade or other pointed object to check for signs of rot.

Damage is most likely to occur where floorboards have been improperly replaced or supported following repair and maintenance of service pipes and wires—particularly in areas subjected continuously to heavy loads. A loose or fractured board can cause a great deal of wear on any floor covering laid over it.

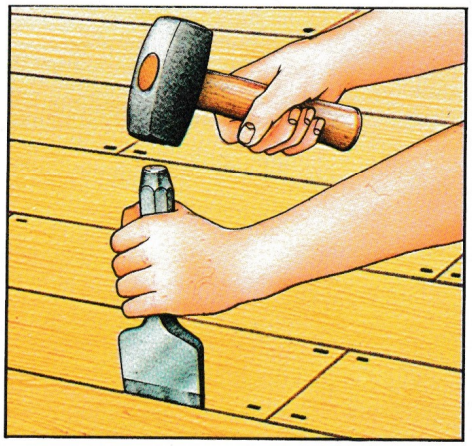
Types of floorboard

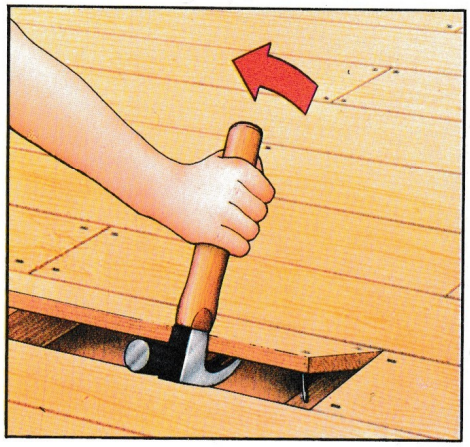
Most floorboards are made of softwood, usually pine. Boards are nearly always fixed at right-angles to the joists which support them, and may be nailed or screwed in place. The board ends are arranged to coincide with the joists, so that the join lies over the centre of the joist, for maximum support.

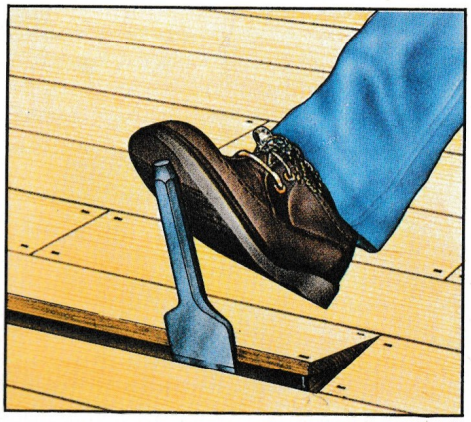
The floorboards found in general household use fall into two basic types: square-edged, and tongue-and-grooved (fig. E). Tongued-and-grooved boards and their derivatives are designed to eliminate draughty gaps but are more difficult to take up than their square-edged counterparts.

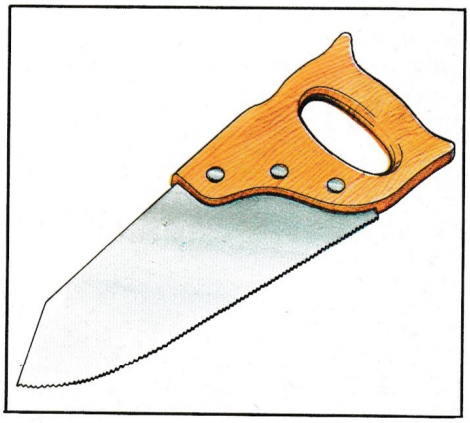
If you are in any doubt which of the two types is used for your flooring, choose two boards with a slight gap

A. *Prise the floorboard up first with a bolster then use a claw hammer. A flooring saw is very useful for cutting out boards in shorter lengths easily*

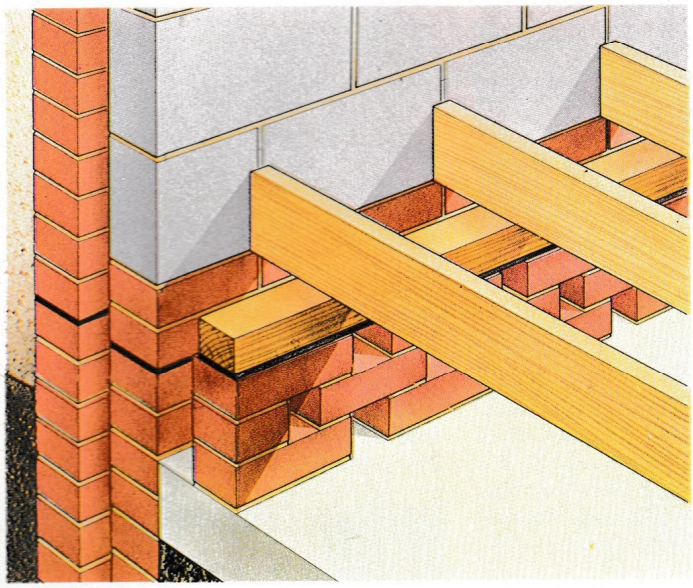




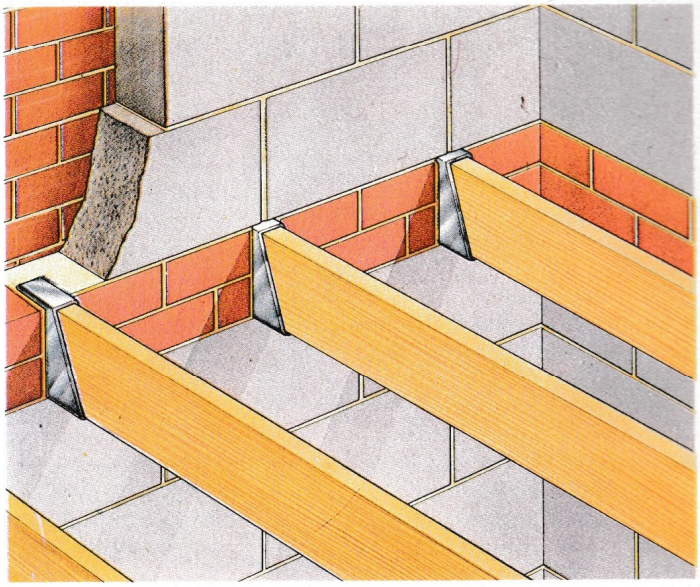




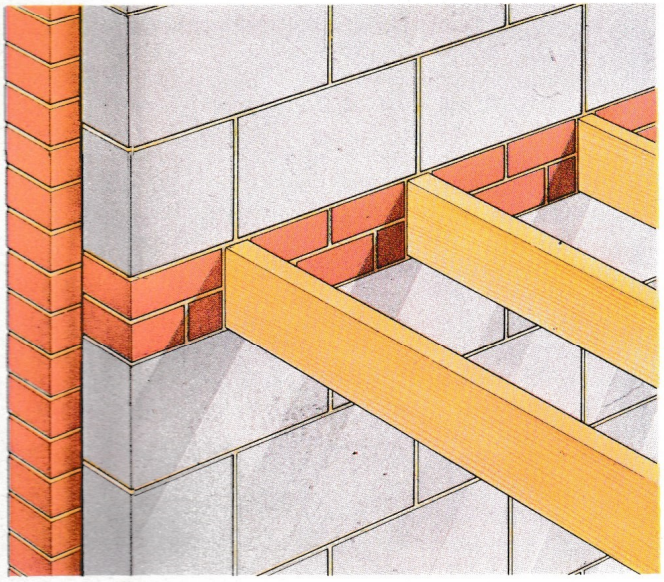
Joists and floorboards



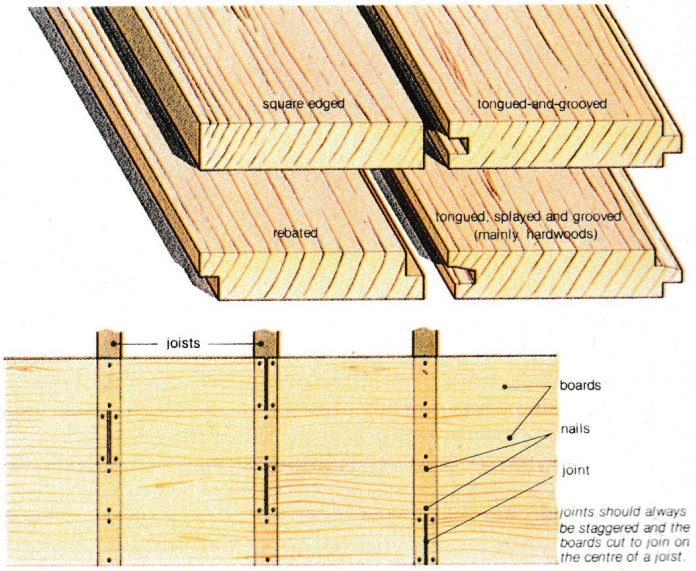
B. *Joists of a suspended floor are supported on small sleeper walls on a concrete base*



C. *Metal brackets built into the inner wall is one method of supporting an upstairs floor*



D. *Flooring joists can also be built into the inner of two walls*



E. *A variety of floorboard types are in use, all fixed to the joists at right angles*

Hayward Art Group

between them and slide a knife blade in as far as possible—compacted grime or draughtproofing in the gap may have to be scratched out first. If the blade is stopped, the boards are either tongued or rebated.

Lifting square-edged boards

For your starting point, choose the most convenient free end of the board you wish to lift. If the board extends right across the room and under the skirting on both sides, you may find it easier to cut it at some convenient point so that board actually under the skirting does not have to be removed.

To lift the board, insert a bolster into the joint gap between it and the board on one side, in line with the nails at the free end. Use a claw hammer to drive it home. Then, treading on the handle with steady pressure, push the bolster down towards the floor (fig. A).

As the board is levered up, insert the claw of the hammer under the end of the board and continue levering up from here until the board comes completely free of the joist.

To help lift the rest of the board, insert a metal bar, length of stout timber or piping underneath the free end. Use the bolster and hammer to loosen the board at each line of nails, then lever it clear with the metal bar. For safety, immediately remove any

exposed nails—particularly those left upright in the joists.

If screws have been used to fix the boards these have to be located and removed to avoid ripping through the board when it is levered up.

Removing 'secret' nails is more difficult and some damage at the edges must be accepted when a board is levered up. These edges can be planed smooth or otherwise made good if the boards are re-used.

If a board proves particularly stubborn, try to free the end and insert a metal bar under it. Using the bar as a levering support, stamp on the free end. After each stamp there should be some 'give', so move the support along the board towards the next joist until the nails give way here. A last resort is to cut the board free at the joists then chip off the remaining wood with a chisel.

Lifting tongued board

Start by choosing a suitable free end and section of board, well clear of the skirting. To break the tongue, insert a bolster into the join between two adjacent boards at the end of the board you wish to lift (fig. A). Give the bolster a few sharp taps with a hammer, until you feel or hear the tongue below start to split. Continue until the split extends at least 75mm from the nails, or until you otherwise judge it to be clear of the joist. You can then replace the bolster with a saw, knowing that at least the joists are safe from damage.

You can use almost any type of saw but a compromise between the awkward length of a hand saw and the short length of usable blade on a tenon saw is a purpose-made *flooring saw*. This has a short, stout curved blade for cutting wood in cramped places (fig. A).

If a circular-blade power saw is used, set the sawing blade depth to about the thickness of the board to avoid any damage to pipes and wires suspended below the flooring.

Continue cutting between the two boards until you are about 75mm from the next line of nails, and once again use the bolster to break the tongue along the stretch directly over the joists. When you are about 75mm past the nails, or otherwise know you are clear of the joist, use a saw again. Continue alternating the cutting methods for the length of the board.

When the tongue is fully severed, use the bolster, claw hammer and metal bar to lever up the board as you would do to lift a square-edged one. In this case, though, concentrate your levering activities at the end and along the severed side of the board at each joist. You should be able to lift the nails and tilt the board enough for the interlocked side to slide free of the adjacent board.

Well-fitted tongued-and-grooved boards may be so tightly cramped together that splitting them apart with a bolster and hammer may not be possible without causing extensive damage to both boards. In this case, the board you wish to remove must be split lengthways at the middle.

A circular saw is best for this job. Keep the cutting depth to less than the thickness of the board at the point where the board crosses the joists. Hammer the bolster into these partly-sawn sections to complete the split. Other types of saw may be used such as a floorboard saw, but with increased difficulty. It may help to adopt some of the techniques for cutting across a board.

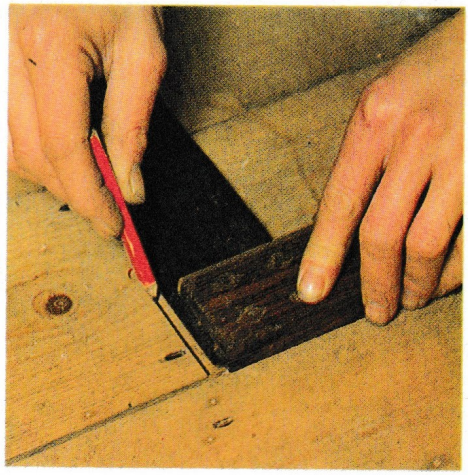
Cutting a floorboard

It is best to cut across a floorboard either over a joist or to the side of one, so that support for the new board ends is readily available. Cutting over a joist is a little more difficult than cutting beside one, but enables you to nail the cut section straight back in place.

Cutting on a joist: It is important to make the cut along the centre of the joist, otherwise the end of one or other of the two freshly-made board ends is not going to be supported properly.

The centre line of the joist can be pin-pointed by following on the line of nails of adjacent boards and board ends. Use a try square to pencil cutting mark on a line joining the farthest possible reference points on each side of the board you are cutting. You can do this by eye or, better, by stretching a piece of string over the distance between the two points. If you are cutting alongside a board with a clearly indicated joist, just continue the line of the board end (or fixings) when marking the cutting line. If the nails are staggered, take a common centre-line from as many boards as possible.

The ideal hand tool for making the cut is a flooring saw, because with this you do not have to raise the whole length of the affected board much more than a board thickness above those adjacent. If you have one, a circular-bladed power saw is just as good for the job. A partial cut can be completed using a bolster and hammer if the board cannot be raised enough



1 *When you've located the joist, mark a cutting line above or to one side (depending where you choose to cut) parallel with the joist*

2 *Using a piece of wood as a guide, scratch and then tease a cut with the first few teeth if you are using a tenon saw to cut on the joist*

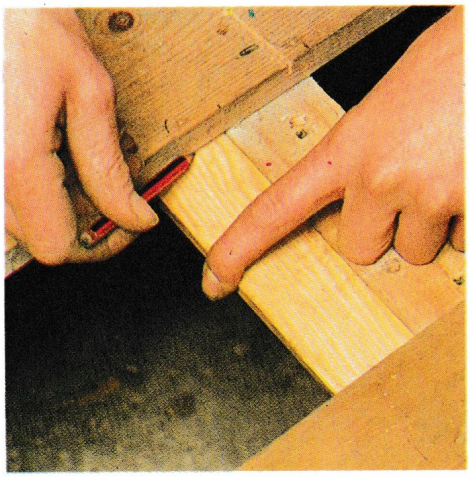
3 *If you are using a padsaw or power jig saw to make a cut beside a joist, drill a small hole the width of the blade*

4 *Use a padsaw to cut across the board or, if you prefer, as far as necessary before substituting a handsaw*

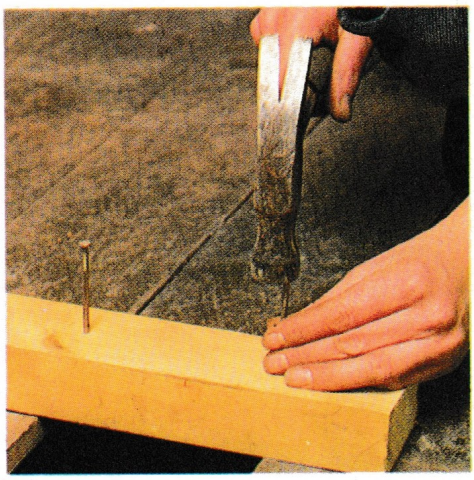
5 *A padsaw can be used to sever the tongue of a tongued-and-grooved board if other forms of sawing are impracticable*

6 *Remove nails from the joist using a claw hammer. Protect the board alongside with an offcut. Do not hammer old nails into the joists*

7 *When making an extra support, start by cutting a generous length of stout timber. The extra width ensures that the board is firmly fixed*



8 *Mark the floorboard gap on the upper surface of the bearer. As you can see the bearer straddles the gap and acts just like the joist*



9 *Partly skew-nail the support, to the point when the nails are just about to break through on the other side of the timber*

to be severed completely by sawing.

If the board is long enough, you may be able to lever it up high enough for a tenon saw to be used for the cut. Support the board with two offcuts of timber wedged underneath, one each side of a cutting mark in line with the centre of the joist.

But if the board is not long enough —and pliable enough—to bow upwards in this way, the cut has to be made with the board fixed in place. In this instance, it may be better to cut the board at the side of the joist for even with a flooring saw cutting on the joist is not without its problems.

Cutting beside a joist: First locate the joist side. You may be able to do this by inserting a knife or metal rule into the gap between the floorboards, sliding it along until it hits the joist. Mark the board at this point, and use a try square to complete the cutting line. Alternatively, and if there is a gap between the floorboards on the other side, repeat probing and simply join up the two points marked on the board. This cutting line represents the limit of any cut in the direction of the joist (fig. 1).

Drill an 8mm hole up against and at one end of the cutting line (fig. 3) then use a *padsaw* or power jig saw to cut next to, and along the cutting line. The padsaw can be replaced with a handsaw or circular-blade power saw when convenient, and re-used if necessary at the end of the cut.

If you like, use a padsaw or jig saw to cut directly in from the gap between two boards. Curve the cut into the cutting line and, when the plank has been severed, finish the cut off from the other direction.

10 *Complete the nailing while pushing the bearer against the joist and upwards against the fixed boards on both sides*

Fitting an extra support

If you have removed a section of floorboard by cutting along the side of a joist, you must fit an extra bit of timber to the joist, in order to provide support for the new board end as there is no overlap.

Make this support from an offcut of softwood, whose minimum dimensions ought to be no less than 38mm by 50mm. Cut it to length, slightly longer than the width of floorboarding removed and use either nails or screws for fixing it in place (fig. 9). If you choose nails, use two or three about 75mm long for each board width, and hammer these partially into the broader side before positioning the bearer. If you use screws, two for each board width are enough, but drill pilot holes before fitting them.

Position the support against the joist and make sure that the top edges of both pieces of timber are exactly flush. Pull it upwards, tightly against the floorboards on either side, while you hammer or screw the bearer securely in place (fig. 10).

Replacing square-edged boards

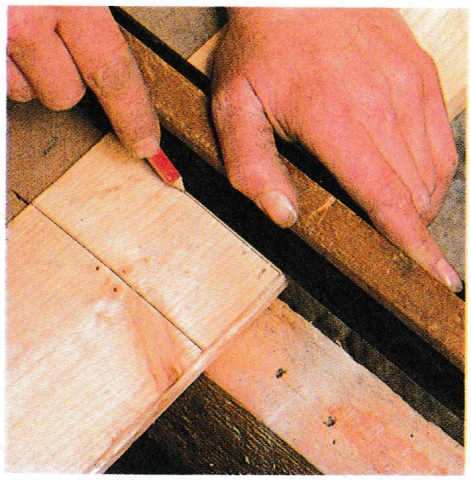
There are few problems in replacing square-edged boards. New ones of the same thickness are cut to length and —in the case of non-standard sizes— to width. If part of the board has to be tapered or otherwise shaped to fit, use the discarded board as a template when you saw and plane to shape the new one.

If a single board is to be replaced simply slot it into place and nail down. A number of boards covering a large area are best fitted individually—if possible in the same flooring 'pattern' as originally. No two board ends should lie adjacent on the same joist.

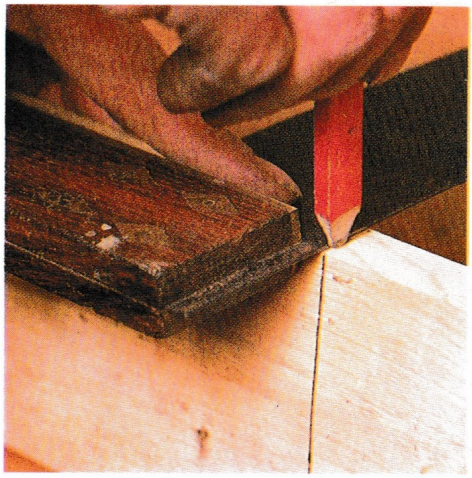
When fitting a number of boards, do a 'dry run' first to check the width fit, and whether tight butting of the boards is possible. Where the boards are to remain visible, keep to the original spacings for the sake of appearance.

If a complete floor area is being replaced, make a point of butting all boards as tightly as possible before fixing. This is done with a *floor cramp* —available from hire shops—and substantially improves underfloor draught-proofing (fig. 18).

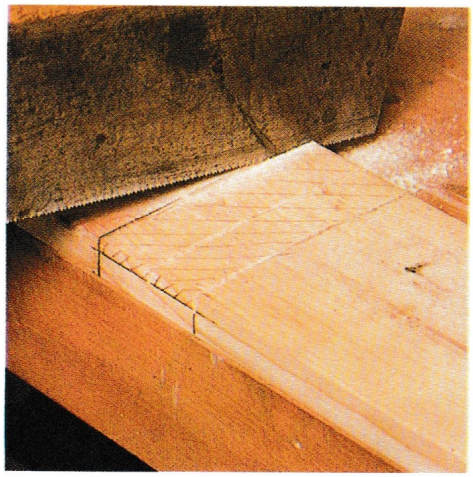
If part of the original floorboarding is to be replaced, splits at the ends caused by nails during removal have to be avoided when fixing. These, and fixing holes along the length of the board should be made good with a filler paste before the floorboard is replaced.



11 *If fitting a thicker board than the rest, a cut-out has to be made where the board crosses a joists. First mark the joist's position*

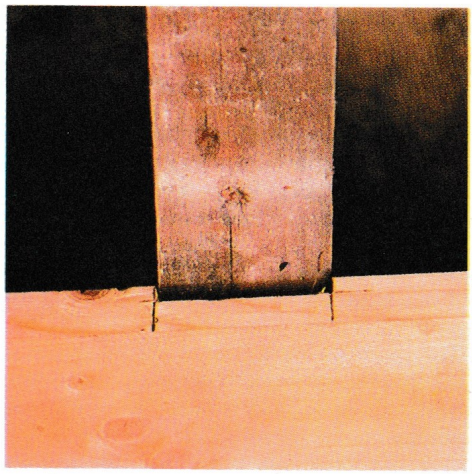


12 *Transfer the joist position marks on the underside surface to both edges of the replacement board at every joist position*



13 *Carefully cut the board in order not to exceed the required rebate depth—this can be gauged by sight or by direct measurement*

14 *Use a chisel to remove wood between the cutting lines. The chisel face should be down. Work in stages to end with a level cut*



15 *Check that the rebate fits snugly and is of the required depth. Continue chiselling if the board is proud of those alongside*

16 *If the replacement board is too thin, use sheet wood to make up the difference. Do not use newspaper folds for this job*

Tongued-and-grooved boards

Replacing tongued-and-grooved boards is not quite so straightforward. If you are using the old board, this can be replaced by fitting the remaining tongued or grooved side into the adjacent board. A small gap will remain on the other side—this must by plugged for complete draught-proofing.

A new tongued-and-grooved board can be put in place only if the tongue that was severed belonged to the adjacent board. If the tongue that was severed belonged to the discarded board, the tongue of the new board has to be removed prior to fitting. This should be planed off.

If a number of adjacent boards have been removed, any necessary combination of used and new boards may be used when reflooring. The technique is to loosely fit these together over the floor area to be covered, in the process forming a slight arch. Lay a spare plank over this, and press or stamp the boards down: the tongues and grooves knit together in the process. The flattened boards can then be fixed in place.

Fitting a new board

If you are cutting out and replacing a short section of floorboard you may want to use up a spare piece of timber lying about the house. Alternatively, you may have difficulty getting a replacement board which exactly matches the thickness of your existing ones. Either way, the new board will be better too thick than too thin.

Having cut your new section to length, lay it beside the gap in the floor and mark off on the underside where it is to pass over a joist. Chisel out rough rebates between the marks, to the same depth as the board is oversize (fig. 14).

When you lay the board, the rebates should fit over the joists and allow it to rest flush with the others.

In some cases it may be possible to use a replacement board which is thinner than the rest. The depth is made up by cutting hardboard or plywood packing strips to the width of the board and fitting them between the joist and the replacement board as it is laid (fig. 16). This, however, is considered bad practice if the packing is more than 6mm deep.

Dealing with creaking boards

Loose and creaking floorboards may be caused by incorrect nailing, by the joists below them settling, or by warping and shrinkage. It is usually possible to cure a loose board simply by renailing or screwing it back in place. But before you do this, check that the loose joint coincides with the centre of the joist below, taking the board up if necessary. If it does not, consider fitting a new bearer or a replacement board.

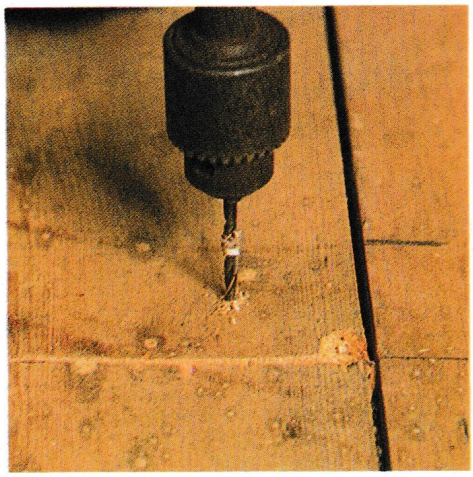
To nail floorboards, use 50mm lost-head nails or flooring brads. Position them next to, and about 12mm away from, the existing nails. When you have finished, drive all the nail heads well below the surface of the board with a nail punch.

To secure floorboards with screws, use 40mm countersunk steel screws. Drill pilot holes for them 12mm from each existing nail, but take care that the holes go no deeper than the thickness of the board. When all the screws are in place, make sure that none of them protrudes above the surface.

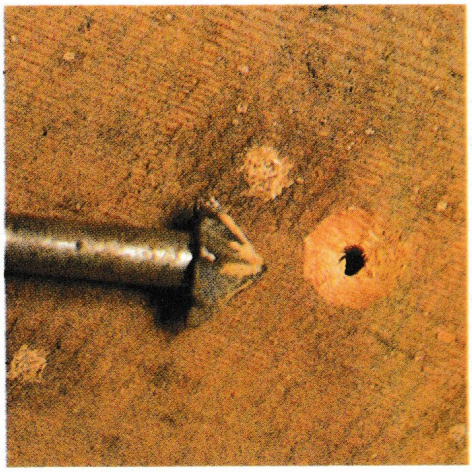
17 *When replacing tongued boards the last two will need force before slipping into fit—use a mallet—and protective wood offcut*

18 *Nailing boards into place. A pencil line ensures accuracy. A floor cramp—worth hiring for big jobs—keeps the boards tightly packed*

19 *If you decide to use nails for fixing a floorboard in place, hammer in the heads using a punch. Use filler and stain to conceal the hole*



20 *If you choose to screw down a board, drill a hole to accept the screw body only. This minimizes the effort needed in fixing boards*



21 *Use a countersink bit to drill a recess for the screw head and—if necessary—fill the hole once the board has been screwed to the joist*

Project

Space-saving hi-fi unit

Gavin Cochrane

Finding space for the components of a hi-fi system can be a problem. This simple unit uses corner space that is often wasted to house record and tape decks, a tuner/amp and a collection of records and tapes

This unit is constructed using only the simplest techniques. The joints, for example, are made using wooden battens or plastic joint fittings.

The main material is veneered chipboard. This is easy to work with, and requiries very little work to achieve a high standard of surface finish. The sawn edges of the chipboard are covered by using a matching iron-on veneer edging strip. The finished unit is stylish in mahogany veneer, which complements the decor of just about any room and matches the cabinets of most speaker units.

A hardboard back is fitted to give the construction extra strength and keep dust away from the contents.

The unit is supported on a recessed plinth to protect the base from accidental knocks and to give a light appearance. This is made from planed softwood and finished matt black.

The top of the unit is large enough for most standard decks and provides a sturdy vibration-free support at a convenient height. Although designed as free-standing furniture, it is easy to mount it to the wall if a firmer support is needed—just by screwing through the back boards into drilled and plugged holes.

The upper half of the unit is divided into space for a cassette deck and a tuner/amplifier. Those shown are of a typical size, but it is easy to modify the design to accommodate your own hi-fi equipment.

Below these, there is storage space for a sizeable record collection. The records are stored upright to prevent warping, so the titles are easily read on their spines. Space for cassettes is provided by the two small additional units which can also be used for accessories such as record cleaners.

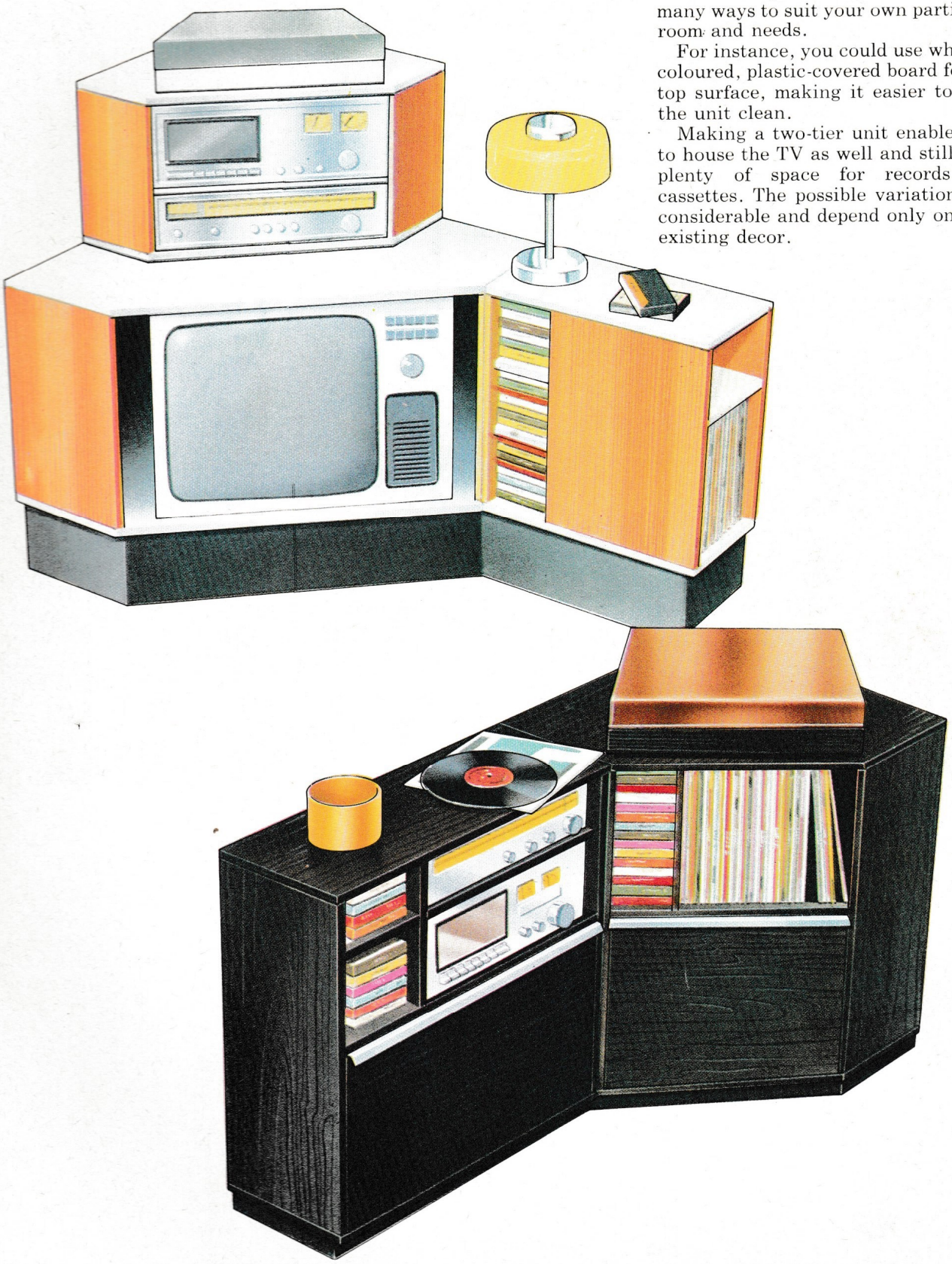
Connections between the components of the hi-fi system are led through the back of the unit. This gives a neat, uncluttered appearance and protects the leads themselves from accidental pulls. The connections to external speakers can also be led out at the back of the unit and concealed at ground level by feeding them under a carpet or rug.

Alternative ideas

You can adapt the basic corner unit in many ways to suit your own particular room and needs.

For instance, you could use white or coloured, plastic-covered board for the top surface, making it easier to keep the unit clean.

Making a two-tier unit enables you to house the TV as well and still have plenty of space for records and cassettes. The possible variations are considerable and depend only on your existing decor.

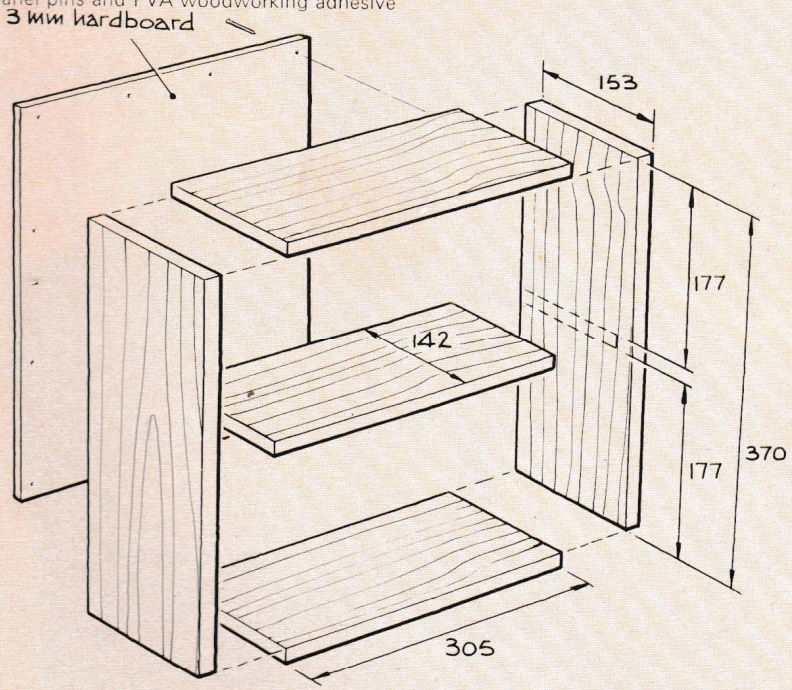


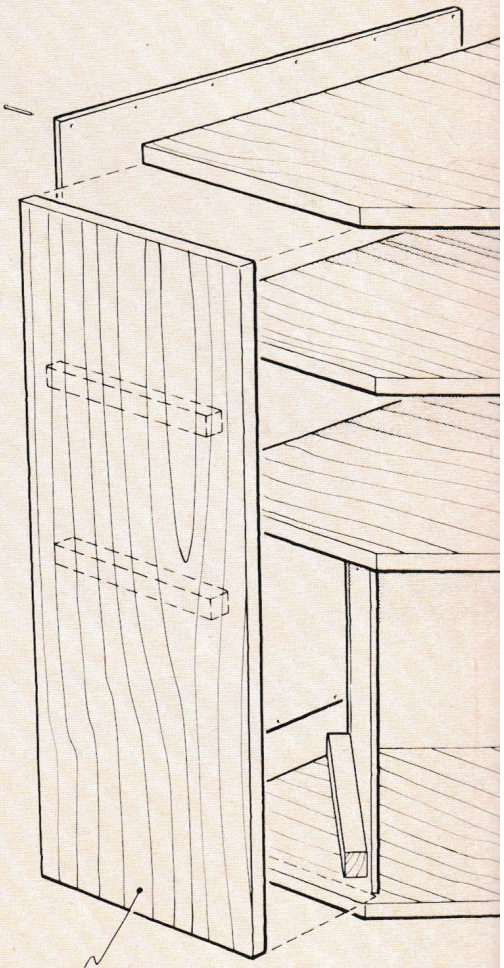
Advertising Arts

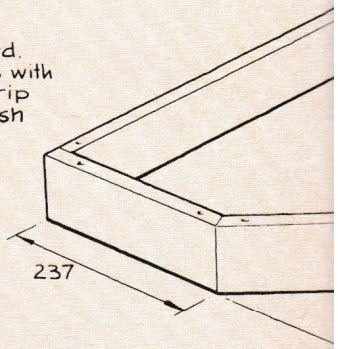
Workplan

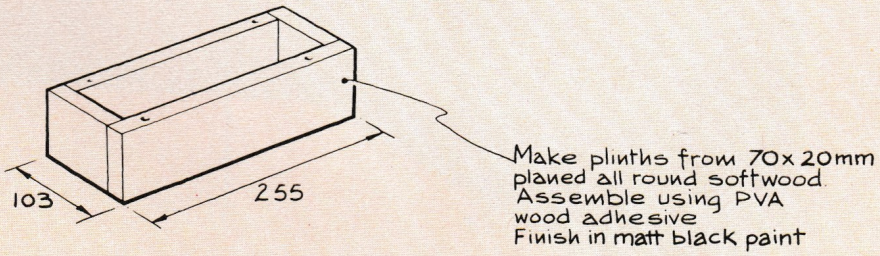
Cutting list

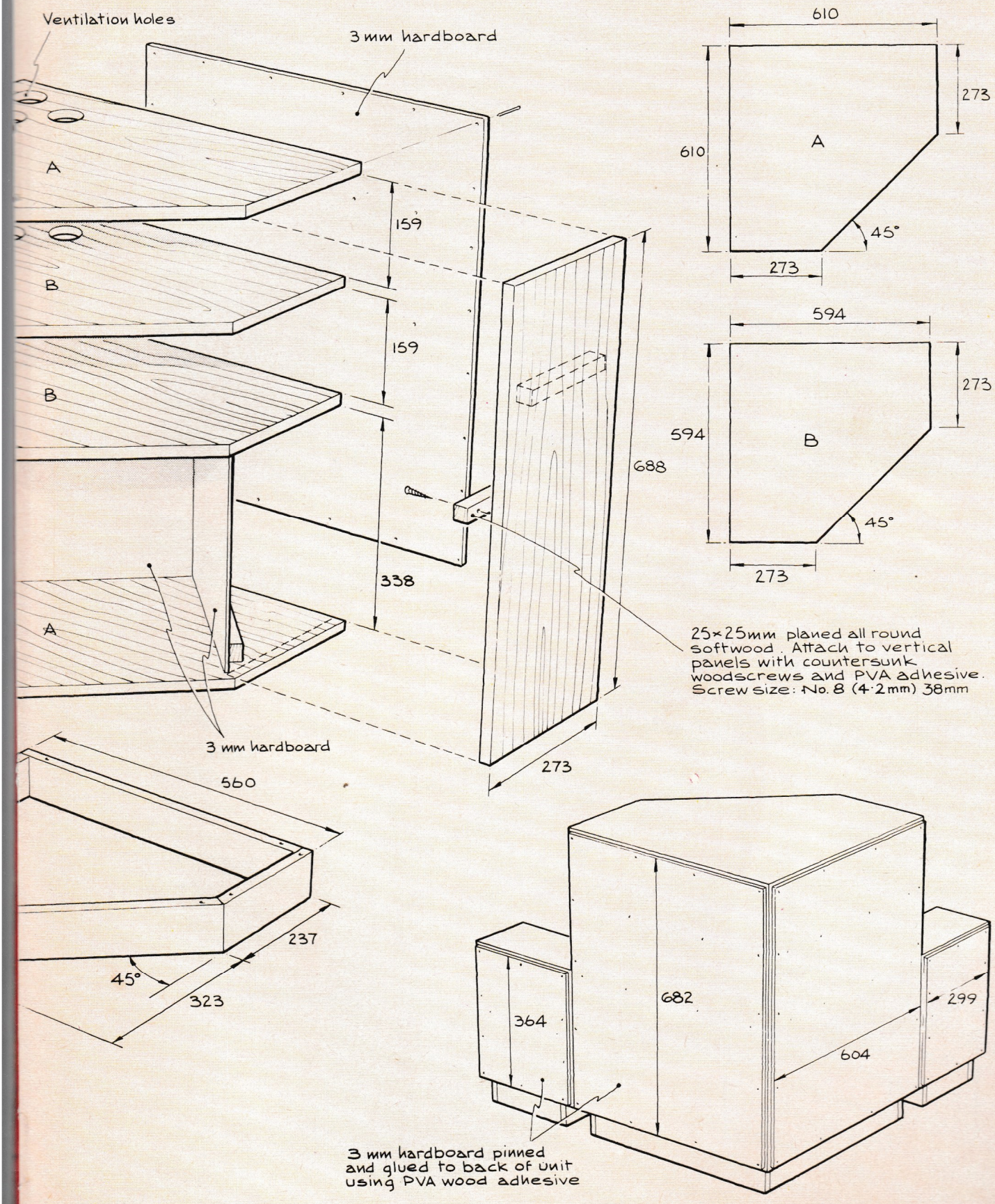
Main unit
Top base: 2 No. 610mm x 610mm x 16mm mahogany veneered chipboard
Side panels: 2 No. 688mm x 273mm x 16mm mahogany veneered chipboard
Shelves: 2 No. 594mm x 594mm x 16mm mahogany veneered chipboard
Backboards: 2 No. 682mm x 604mm x 3mm hardboard
Plinth: 2 No. 237mm x 70mm x 20mm planed softwood, 1 No. 540mm x 70mm x 20mm planed softwood, 1 No. 520mm x 70mm x 20mm planed softwood, 1 No. 457mm x 70mm x 20mm planed softwood, 10 No. 8 38mm steel screws
Record compartment: 2 No. 338mm x 290mm x 3mm hardboard, 1 No. 450mm x 338mm x 3mm hardboard
Shelf supports: 4 No. 250mm x 25mm x 25mm planed softwood, 8 No. 8 38mm steel countersunk screws (or 8 No. plastic joint fittings)
Corner blocks: 4 No. 250mm x 25mm planed softwood, 8 No. 8 38mm steel countersunk screws (or 8 No. plastic joint fittings)
Record compartment supports: 4 No. 250mm x 25mm x 25mm planed softwood, 2 No. 400mm x 25mm x 25mm planed softwood, 12 No. 8 38mm steel screws.
Edgings: 2930mm x 16mm adhesive mahogany veneer edging strip
20mm panel pins and PVA woodworking adhesive as required
Side Units (each)
Top base: 2 No. 305mm x 153mm x 16mm mahogany veneered chipboard
Side panels: 2 No. 370mm x 153mm x 16mm mahogany veneered chipboard
Shelf: 305mm x 142mm x 16mm mahogany veneered chipboard
Backboard: 364mm x 331mm x 3mm hardboard
Plinth: 2 No. 83mm x 70mm x 20mm planed softwood, 1 No. 255mm x 70mm x 20mm planed softwood, 1 No. 215mm x 70mm x 20mm planed softwood, 8 No. 8 38mm steel countersunk woodscrews
Shelf supports: 2 No. 120mm x 25mm x 25mm planed softwood, 4 No. 8 38mm steel countersunk woodscrews (or 4 No. plastic joint fittings)
Corner blocks: 4 No. 130mm x 25mm x 25mm planed softwood, 8 No. 8 38mm steel countersunk woodscrews (or 4 No. plastic joint fittings)
Edgings: 2267mm x 16mm adhesive mahogany veneer edging strip
20mm panel pins and PVA woodworking adhesive



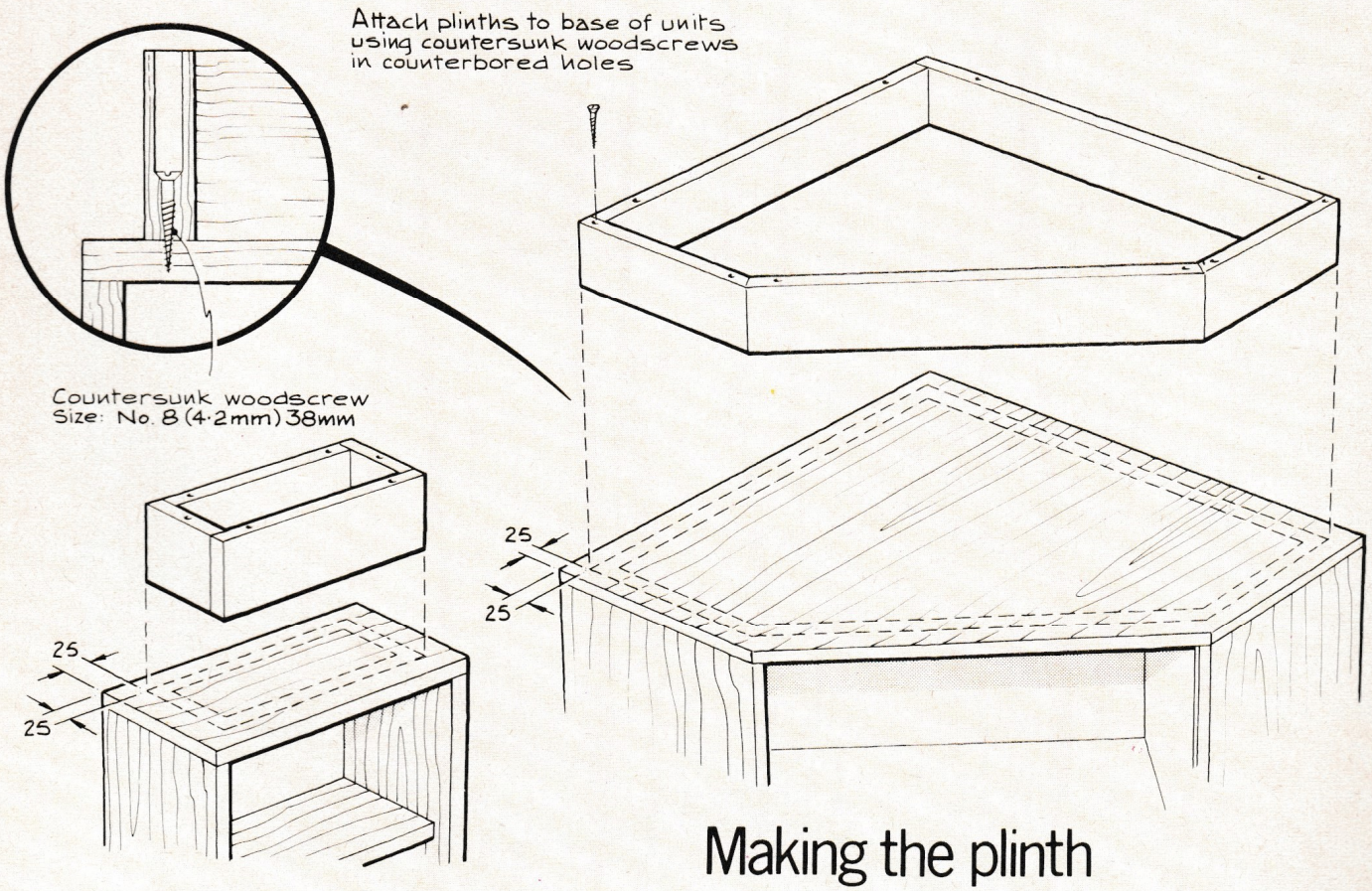





103
255
Make plinths from 70x20mm planed all round softwood. Assemble using PVA wood adhesive
Finish in matt black paint

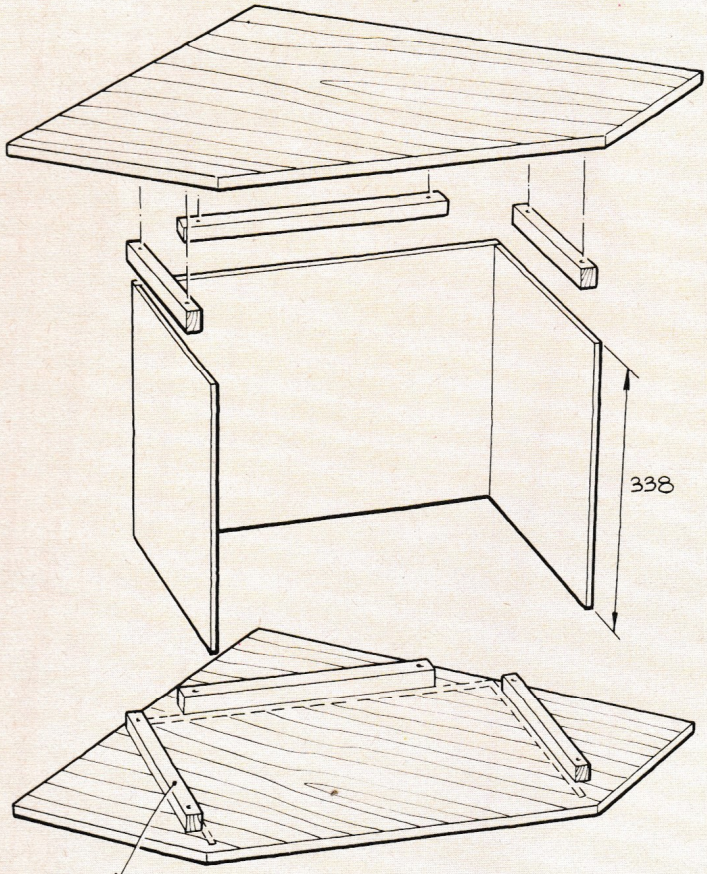

Ventilation holes
3 mm hardboard
A
B
B
A
159
159
338
688
273
610
610
A
273
45°
273
594
594
B
273
45°
273
25×25mm planed all round softwood. Attach to vertical panels with countersunk woodscrews and PVA adhesive. Screw size: No. 8 (4·2mm) 38mm
3 mm hardboard
560
237
45°
323
682
364
299
604
3 mm hardboard pinned and glued to back of unit using PVA wood adhesive

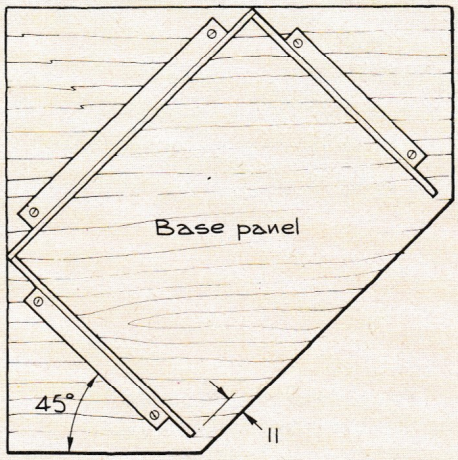
Gavin Cochrane



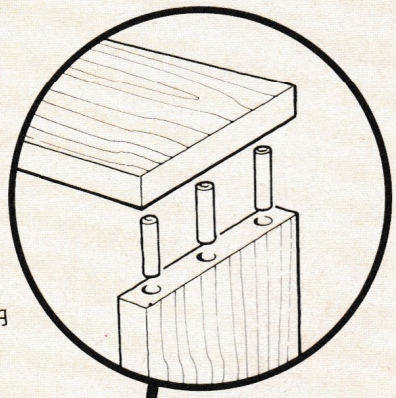
Making the plinth

Making the record compartment

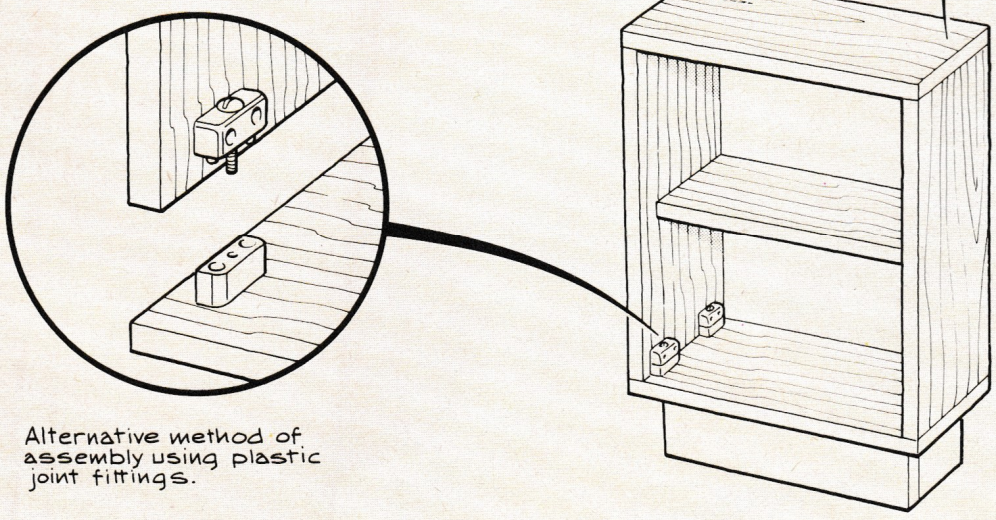




25×25mm planed all round softwood. Assemble using countersunk woodscrews and PVA wood adhesive. Screw size: No. 8 (4·2mm) 38mm



Units may be assembled using dowels and PVA wood adhesive

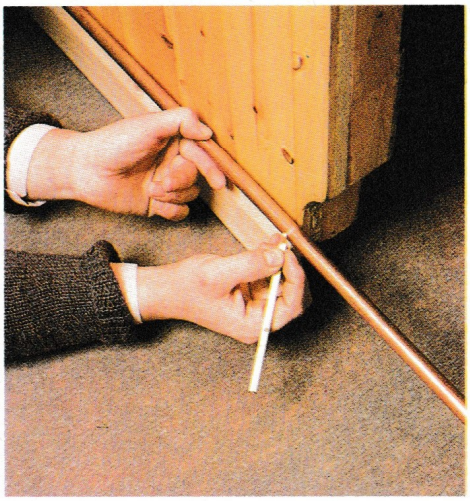


Alternative method of assembly using plastic joint fittings.

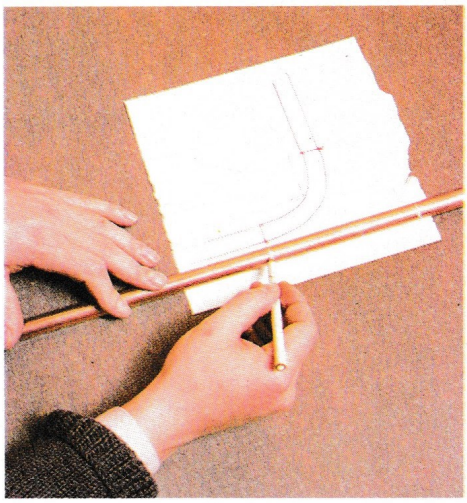
Bending copper pipe

● Annealing copper piping for better bends ● Use of a bending spring ● Planning a pipework route ● The technique of making flawless bends ● Use of flexible hosing in place of fixed bends

Below: *A blowtorch, thick gloves, a bending spring of the correct diameter and a brick shield are the basic requirements for pipe bending*



1 *Mark the start of the bending length at a point a little before the corner of the wall. Direct measurement is best*



2 *Draw out a rough and ready pattern to help you mark out the bending length and to use as a guide when bending*

3 *Anneal the bending length. A firebrick 'oven' prevents flame damage and concentrates heat but is not essential*

If you are going to attempt much domestic plumbing, sooner or later you will need to make bends in copper piping. Indeed, one of the advantages of using copper piping is the ease with which it is worked. But while the techniques of bending copper piping are not difficult to master, considerable care is required in the planning stages: even when making bends presents no problems, it is often easier to make use of standard shaped capillary fittings or compression joints in most bends.

All domestic copper pipe sizes can be bent by hand, one way or another—each with varying success. Special bending tools are recommended for the larger bore tubing if the pipe is not to be flattened as it is bent.

Straight tubing has a wall whose opposite faces are always parallel—and which must remain so even after bending if the true round section across the tube is to be maintained. Some distortion, however, takes place on both the outside and the inside walls of the pipe as it is bent. The outside wall (or 'back') of the bend is stretched and the inside (or 'throat') of the bend is compressed slightly.

The forces involved in bending a section of copper piping will cause the tube to collapse and flatten unless precautions are taken. This means providing some form of internal support unless the stretching force is spread along the bend section length—as happens when a *pipe-bending machine* is used.

Use a *bending spring* to provide the necessary internal support if the pipe is being bent by hand. The diameter of this inexpensive item is matched exactly to a specific tube size, so a set may be required if a variety of pipework sizes are being used. Fine sand, compacted and sealed in place with a stuffed rag or cork, is a cheap and surprisingly effective alternative.

Use of a pipe-bending spring, on its own, does not guarantee success in pipe bending, however. Repeated heating and cooling (annealing) of the bend section (even with 'half-hard' tube) is often necessary to perfect the bend.

Annealing copper tube makes it easier to bend and is done by heating the pipe to a dull cherry-red glow and then cooling it rapidly in a water bath or by pouring water over it. An oven of sorts can be formed using a few firebricks arranged to concentrate the blowlamp heat (fig. 3).

Anneal only the section of piping to be bent—this improves the chances of making a good bend exactly where you would like to have one.

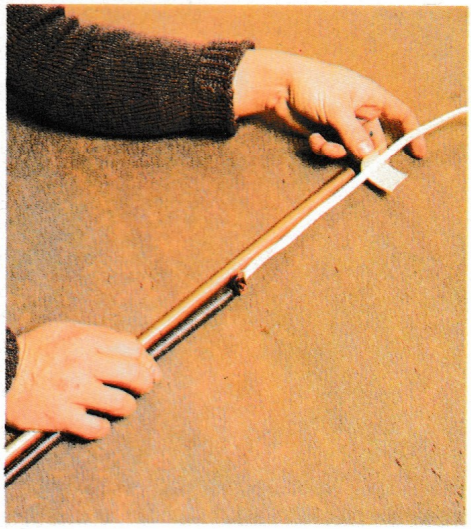
Handle annealed tubing a little more carefully than untreated pipe. The slightest indent makes fitting a bending spring impossible and the correct use of a bending machine difficult. If a badly-made bend occurs in a long pipe run, it is essential the run is terminated and a new section started. A connecting fitting using a capillary joint is especially convenient (see pages 170-175).

Coarse pipework routes

Before attempting to make bends in a pipework run, try the techniques on a spare length beforehand to practice. The greatest problems in planning a pipework route occur when bends have to be made in one long, continuous length of tubing. The routine is one of start, measure off, make a bend, measure off a straight, measure off the bend, make a bend . . . and so forth. All measurements should be made along the centre line of the pipe, especially around bends. Copper piping can be worked into shape beside the pipe run, and literally fitted into place to check measurements of lengths and bends.

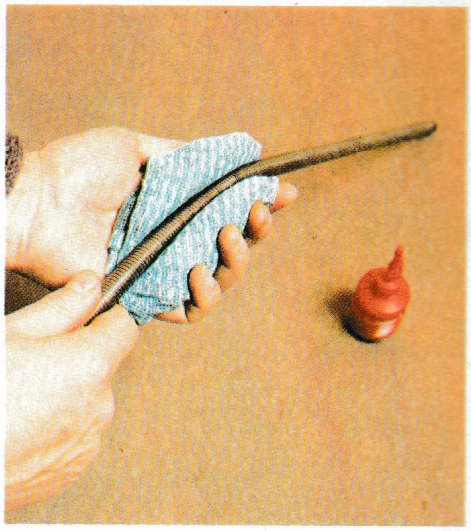
If you adopt this procedure of starting at one end of a pipe run, use a generous length of piping so that, even on the basis of an initial rough measurement of the pipe run distance, there is still enough to enable trimming. The pipe run can then end just

4 *Quickly cool the heated tube using jug and basin if away from running water. Small pieces and pipe ends can be submerged*



5 *If the bend is made more than the bending spring's length along the tube, attach stout wire to help later removal of the spring*

6 *Light lubricating oil or graphite powder can be used to make bending spring insertion and withdrawal easier*



7 *Place some lubricating oil on a cloth and draw the bending spring through this a few times. Only the lightest coating is necessary*

8 *Insert the bending spring using a clockwise, tightening, wrist action until it straddles the region where the bend is required*

9 *Make the bend over your knee. Pull firmly but very slowly until the required angle—or part-angle—is reached and overbend very slightly*

10 *Pull back the overbend carefully to release the bending spring and remove it. Use a screwdriver for twisting the spring*

where required, perhaps tidily out of sight and harm's way.

With this method, mis-judged distances and badly-positioned bends have to be accepted or the whole pipe length has to be replaced.

Wherever possible, make individual bend sections and link these with a suitable capillary joint on the straight sections where trimming and joining present less of a problem.

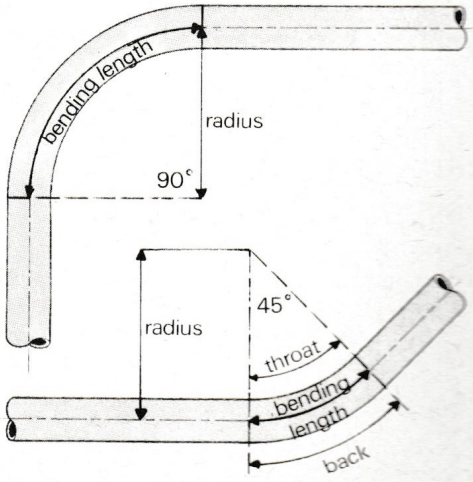
Planning a pipework route

An accurately measured pipework route tends to minimize the number of errors made in a pipe run. If you are going to do the bending by hand, using a bending spring, there is little point in bothering with anything but the coarsest measurements as measurement errors are bound to occur near the bend. Usually this 'shift' can be dealt with by trimming or adding to the reckoned length of a straight on one side or other of the bend.

If, on the other hand, you decide to use a pipe bending machine, accurate measurements can be and ought to be made—particularly when two or more pipes are to run parallel for part of the run on display.

Instructions in the use of such machines vary from model to model, so follow these carefully if you decide to hire one for your project.

The actual overall length of any



A. *Bend angle and bending length*

pipe run corresponds with the centre line of the tube (fig. A), but bear in mind the distance the tube stands clear of the supporting wall when taking measurements. Bending points and other register marks can be easily marked on the copper tubing which is then progressively fed through the bending machine.

Where the pipe run is out of sight, and remains adequately supported, bends and routes can take almost any convenient form. But if the pipework is to remain open to view, bends look best following the supporting wall as closely as possible. This means using rather more 90° bends than may be strictly necessary.

But otherwise never use a 90° bend when a shallower one will suffice. Not only is the shallower bend much easier to make, but its shape causes far less of an obstruction to the flow of water within.

The radius of any bend should be no less than four times the tube width (fig. A). So, if you are using 22mm tube, for instance, the radius of the curve (to the centre line of the tube) ought to be no less than about 90mm. This rule prevents bends that are too tight—and the difficulties of making and of including these in a pipework system.

From this simple minimum radius calculation, you can see that a 90° bend requires a quarter-circle of curve to reach the required angle. This so called 'bending length' is halved in the case of a 45° bend, and divided by a third for a 30° bend (see fig. A). It is useful to mark the pipe with these bending lengths to aid annealing and bend manufacture.

Using a bending spring

A bending spring is the most popular means of making a bend in smaller bore domestic installations, and with care very good results are possible once the correct techniques of use are mastered. It should be slightly greased for use (fig. 6) and then the next step is to locate and mark the pipe at the centre point of the bend, also the bending length extremes.

Next anneal the bending length, even in the case of half-hard tubing. When the pipe has been cooled, insert the bending spring so it straddles the bend section. A spring is only about 600mm in length, so extension rods or very stout wire must be provided if a particularly long pipe section is being bent near its centre. Start at the centre and work 'outwards' in the case of a long pipe run requiring more than a single bend in its length.

Attached to the eyelet of the bending spring, the extension rods or wire length can be laid alongside the tubing and marked with a tape flag to indicate when the spring has been inserted correctly (fig. 5).

It is not difficult to bend 15mm or smaller bore copper tube over your knee, but protect yourself with padding as shown to prevent injury (fig. 9). Larger bore tube may be possible to bend by hand but a former —a stout post, or horizontal bar—is usually necessary.

Bend the pipe very carefully and very slowly—in stages—to a slightly greater degree than required, then pull it back to the correct angle. This restores the true cross-section of the tube, and also releases the bending spring which will be pressed against the throat of the bend.

A large nail, tommy bar or screwdriver inserted into the eyelet provides enough tightening and leverage for the spring to be removed easily.

Except possibly in the case of 15mm tube, piping needs to be annealed two or more times before a 90° angle is reached as the copper hardens through bending strain. Never use force, and always pull the angle slightly straight before withdrawing the spring and again annealing the bend section.

11 *Tube hardens as it is bent so thicker pipework may need annealing several times to make a bend—three times for a 90° bend*

12 *Grease the spring again and use a screwing motion to replace it with thread-tightening leverage if necessary*

13 *Continue making the bend using a firm pull. Mould the bend around your knee as you go, overbending to the required angle*

14 *Fitting the pipework in place. Always use a 'slow bend' such as this where possible—such as when piping disappears behind the facia*

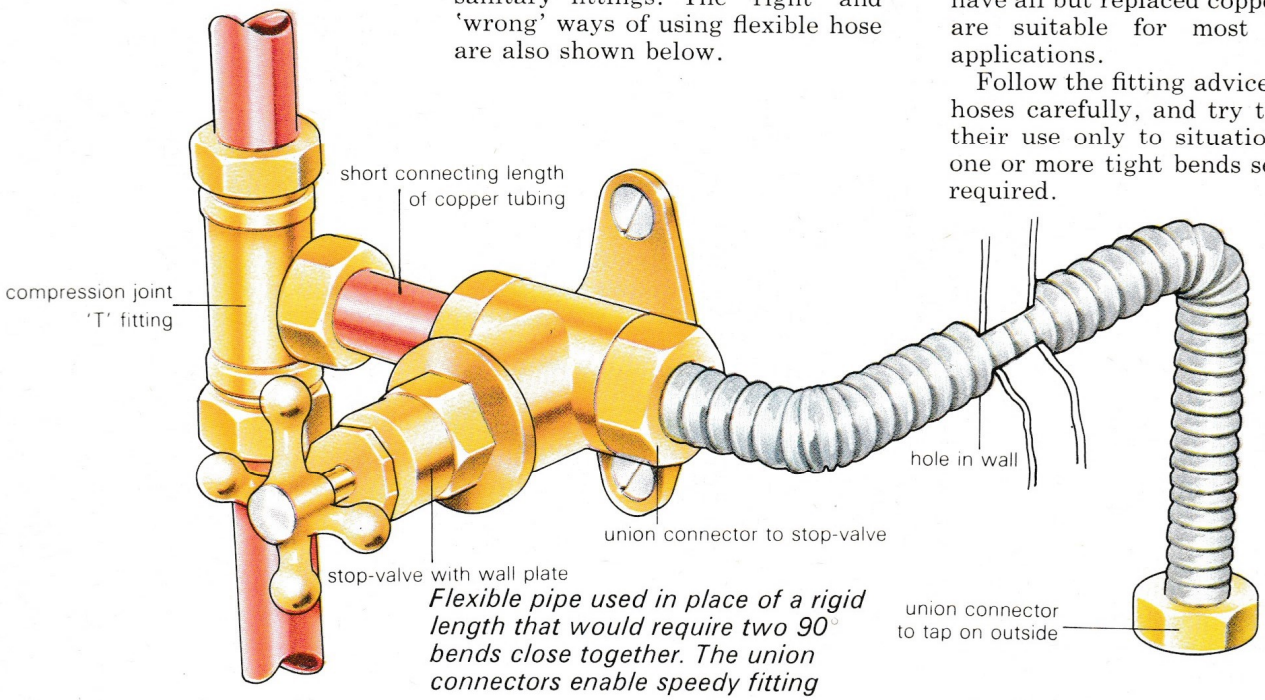
Using flexible pipe

Sometimes it is more convenient to do away with rigid bends and fittings and make use of copper or plastics flexible plumbing hose. These usually come complete with end fittings for quick and speedy connection to existing parts of the pipework.

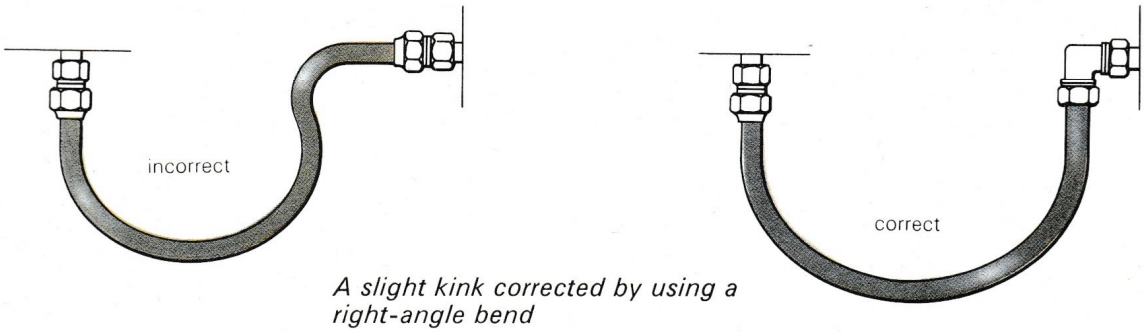
Two typical uses are illustrated in detail: where a connecting length of pipe has to go through a wall, and for simplifying the installation of one tap design in a variety of sanitary fittings. The 'right' and 'wrong' ways of using flexible hose are also shown below.

Copper-cased hosing can be chrome-plated (as for a shower hose) where it might be visible. It is normally provided with union connectors. Plastics equivalents—normally made of polypropylene—have all but replaced copper as they are suitable for most domestic applications.

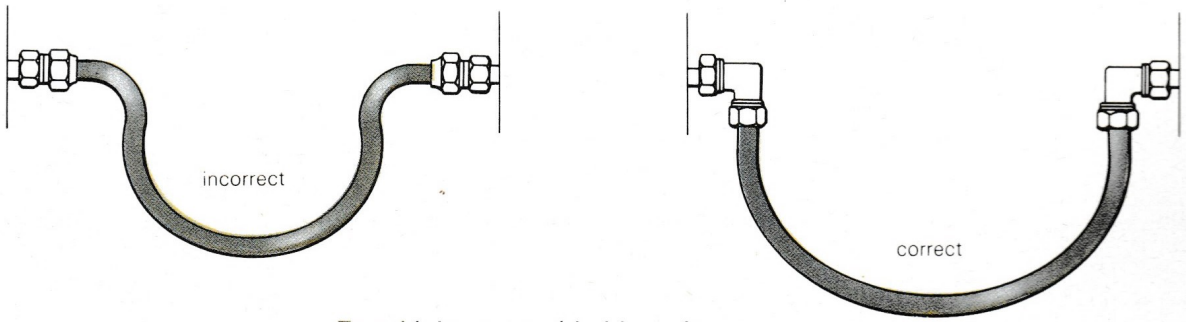
Follow the fitting advice on these hoses carefully, and try to restrict their use only to situations where one or more tight bends seem to be required.


short connecting length of copper tubing
compression joint 'T' fitting
hole in wall
union connector to stop-valve
stop-valve with wall plate
union connector to tap on outside

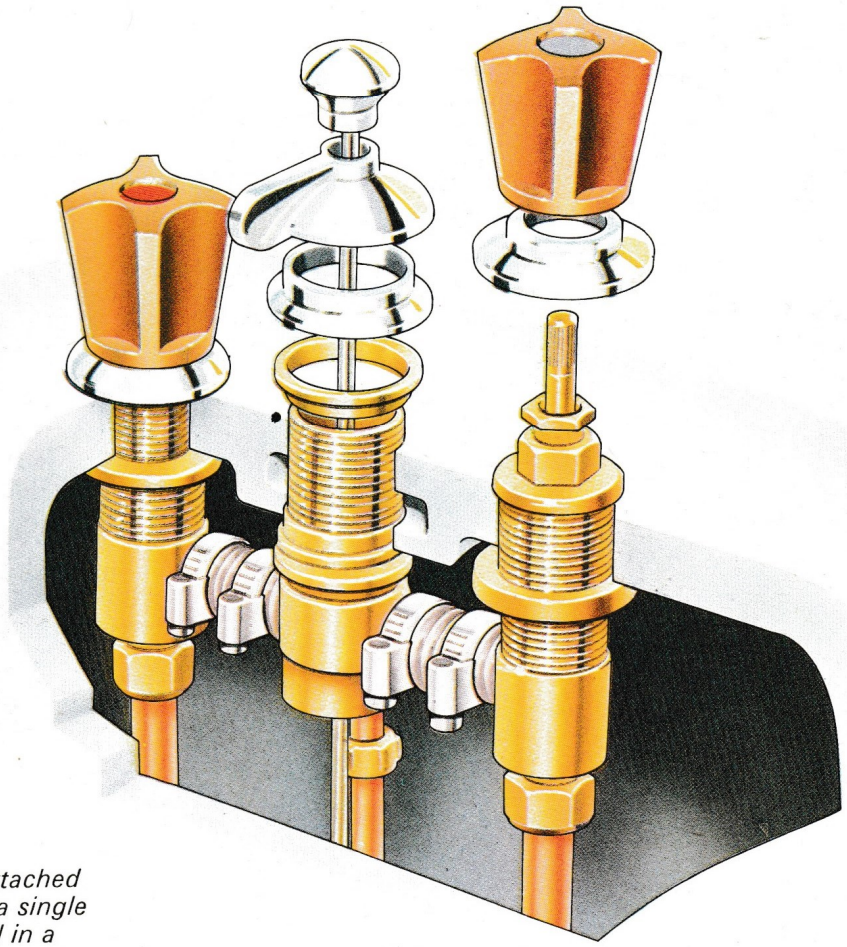
Flexible pipe used in place of a rigid length that would require two 90° bends close together. The union connectors enable speedy fitting



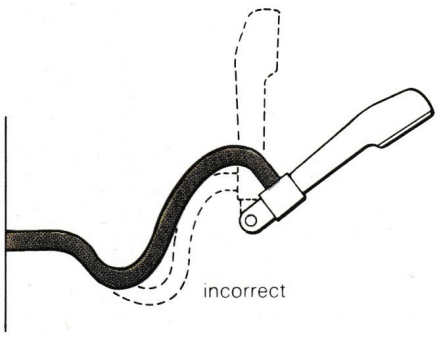
A slight kink corrected by using a right-angle bend



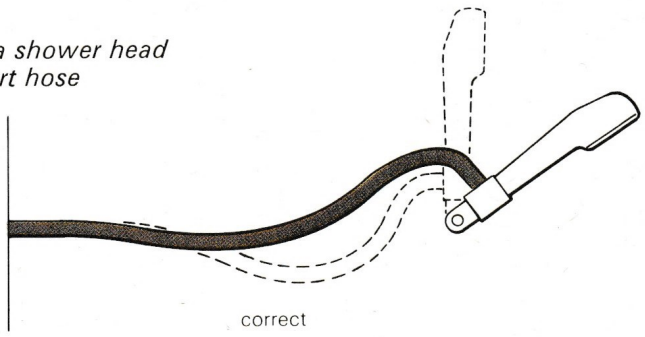
Two kinks are avoided by using bends in place of straight connectors

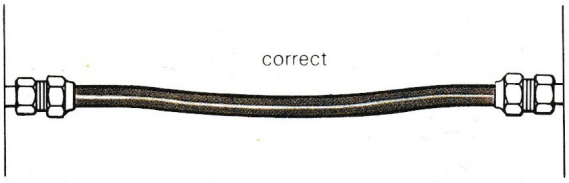


Flexible polypropylene attached by Jubilee clips enables a single tap design to be installed in a variety of fittings



A typical fault in a shower head connection: a short hose





Avoid twisting the hose when tightening the end fittings

Advertising Arts

Papering ceilings

Left: *The ceiling paper must be supported and folded concertina-style so that it can be applied to the ceiling in manageable sections*

● Calculating paper requirements ● Preparing the ceiling ● Erecting a scaffold system ● Chalking a guideline ● Single-handed papering ● Papering around light fittings and chimney breasts ● Cutting the final strip

Papering a ceiling is not as difficult as it looks. With a sensible scaffolding arrangement and the right technique, the job is no harder than papering an ordinary wall. Just make sure that all essential materials are to hand before you start hanging the paper.

How much paper?

First decide which way the paper is to be hung, as this determines how many lengths of paper can be obtained from one roll. A standard roll of wallpaper measures about 10m long, is between 500mm and 550mm wide and covers an area of around 5.3m². To estimate the number of rolls required for your ceiling measure the length of each wall (ignoring any protrusions such as chimney breasts) add the measurements together and match the total against the chart given below.

Other materials

All papers suitable for walls can also be used on ceilings. However, if you choose one of the popular embossed or anaglypta ceiling papers, remember that they turn yellow very quickly and must have at least one coat of emulsion paint applied after hanging. The heavily-embossed ones usually need two coats of paint for a good and even finish.

Different papers require different pastes for hanging and your wallpaper stockist can advise on which is the best for your chosen paper.

The ceiling must be sized to make it less porous before you start hanging, or lined with lining paper. With cellulose wallpaper paste, you can use some of this, diluted, as your size. Cold-water starch pastes require a special glue size.

Distance around the room in metres	No. of rolls required
10.0—12.0	2
12.5—14.5	3
15.0—17.5	4
18.0—20.0	5
20.5—21.5	6
21.5—22.5	7

Lining paper

Lining a ceiling with lining paper is not essential but gives a more lasting finish—providing you hang it at right-angles to the direction which the top paper will eventually take. Also, it prevents the ceiling plaster from showing through if gaps should appear between the joints of the top paper—the embossed and anaglypta papers have a tendency to shrink as the paste slowly dries out.

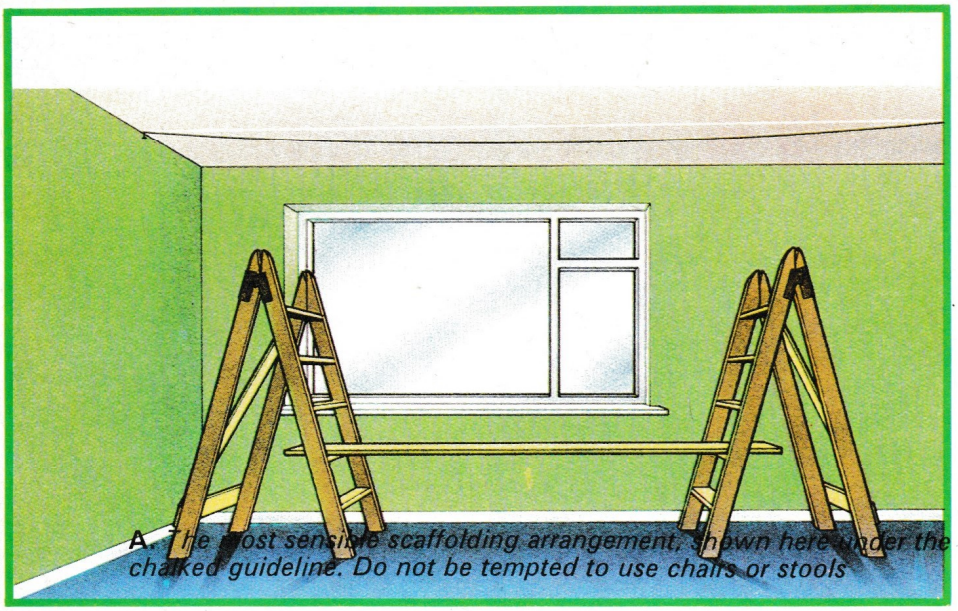
A final plus for using lining paper is that it absorbs paste more evenly than plaster, thus making it easier to apply the top paper.

Preparing the ceiling

Whether or not you decide to apply lining paper, the ceiling must be thoroughly clean and free from loose or flaking paint. Gloss paint must be rubbed down with glasspaper and any cracks filled with a cellulose-based filler. Any old paper must be completely stripped off so the ceiling is left as smooth as possible for the application of the new layer.

Where to start

Where possible, all papering should start and work away from the natural daylight source. This system prevents shadows from obscuring the joints as you hang the paper. Obviously if there is a window in both ends of the room, either one may be used as the starting point. Where a bay window is involved, the first length should be



Bernard Fallon

A. The most sensible scaffolding arrangement, shown here under the chalked guideline. Do not be tempted to use chairs or stools

hung across the opening of the bay and then work back towards the top of the window.

Before you start papering, get yourself properly prepared so all essential equipment and materials are to hand. As far as papering ceilings is concerned the erection of a proper scaffolding arrangement is the most important piece of preparation.

Scaffolding

Make-shift scaffolding is extremely dangerous. To be safe you need two pairs of sturdy stepladders and a wide scaffold plank. Obviously, you do not want to constantly be jumping up and down to move the steps and planks along, so try to get a length of plank approximately the same width of the room, allowing room for the supporting ladders.

Experiment with the positioning of the plank so you have it at a height which does not make you stoop or stretch as you apply the paper (fig. 1). Check the height by standing on the plank and reaching up to the ceiling—you should be able to touch it comfortably with the palm of your hand.

Marking a guideline

The scaffold should be set up under a chalked guideline which marks the outside edge of the first strip. To work out where this line should run, measure the width of the paper and deduct 10mm. The deduction allows for bumps and other imperfections at the junction of the ceiling and the wall. Measuring out from the wall, mark off this measurement on the ceiling at either end of the first run of paper (fig. 2).

Next, fix a steel drawing pin into the ceiling at one of the measured points and tie a length of twine around it. Thoroughly rub the twine with coloured chalk then pull it taut across the ceiling to the other measured point and fix it securely. Pull the centre of the twine down from the ceiling, letting it snap back into place (fig. 3). This leaves an accurate guideline by which you can hang the first length of paper and just the right amount of overlap at the side wall.

Cutting all the lengths of paper you need at one time is useful as it cuts down on the number of interruptions in your work flow. Measure the length of the first strip carefully against the wall allowing at least 100mm excess for trimming. Subsequent strips can then be measured and cut against it. After cutting, the strips are laid face-down on your pasting board.

Pasting

To paste a length of paper evenly, slide it across the board so that it overhangs the edge furthest from you (the back edge) by about 10mm. This prevents the paste from being deposited on the board or on the other lengths of paper.

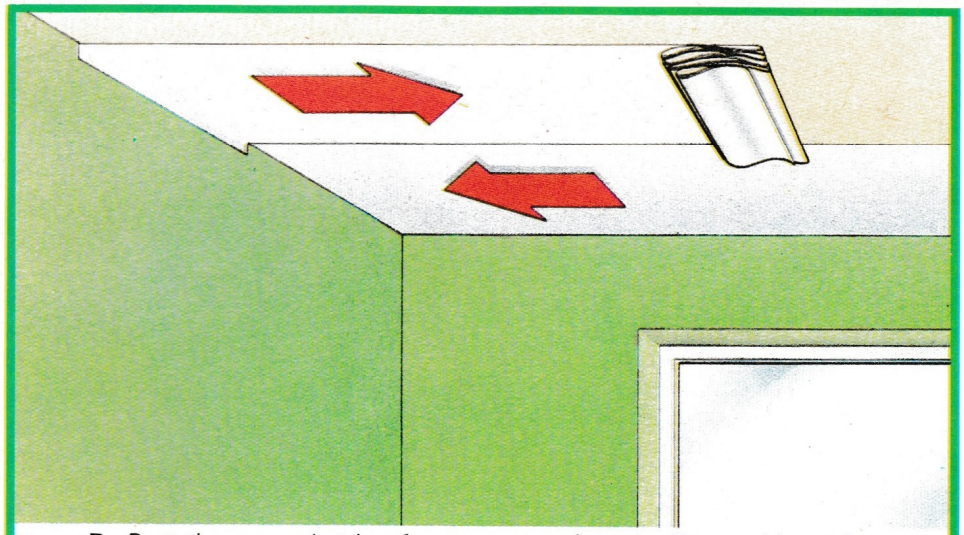
Apply a full brush of paste down the centre of the paper—the larger the brush the quicker can the paste be applied, thus avoiding the risk of drying before the paper is hung.

Brush the paste outwards over the back edge with an overlapping criss-cross action to avoid missing any patches of paper. Gradually draw the paper towards you, overhanging the front edge by about 10mm, as you apply the paste.

1 *When you can comfortably touch the ceiling with the palm of your hand, then the scaffolding is in the correct position*

2 *Deduct 10mm from the width of the paper to find the right measurement for marking off the position of the guideline*

3 *Securely fix the chalked line at one end of the room. Hold the line taut against the other mark and snap it against the ceiling*



Bernard Fallon

B. *Butt the second strip of paper up against the first and hang it in the opposite direction for a smooth finish*

Folding

When you are sure that the length of paper has been completely coated in paste, fold it ready for hanging. Fold over the first 300mm paste to paste, lift the fold and place it on top of the next 300mm (fig. 4). Continue this pattern down the whole length to obtain a concertina-type series of folds. This enables you to release the paper in short, manageable lengths on the ceiling.

A length of string passed through the handle loops of your paste bucket and pulled taut provides a resting place for the paste brush—preventing the paste from dripping onto the floor and the brush from falling into the bucket (fig. 5).

Before climbing up onto the scaffolding to hang the pasted paper, make sure that you have a paper-hanging brush and a pair of sharp scissors or shears within easy reach—in the pocket of your apron or overalls. A cleaner cut is obtained if you take the trouble to clean the paste from your scissors after each length of paper has been trimmed.

Hanging the paper

Place a part roll of paper or cardboard tube under the concertina-folds of the pasted length—this supports the paper and should be held parallel and close to the ceiling at all times (fig. 6). If you are right-handed, take the roll, with its folded, pasted paper on top, in your right hand and hold the paper in place with your thumb—leaving the top fold free.

Pull this top fold open and lay it on to the ceiling against one end of the chalk line. Taking the brush, smooth down the centre of the section then to

4 *Turn in the first 300mm of paper, lift this fold and put it on top of the next 300mm to make a concertina of the whole sheet*

5 *Thread string through the handle loops of the paste bucket and rest the brush on it. This keeps it free of excess paste*

6 *Support the folded, pasted paper with a roll of paper, leaving the top fold free ready to lay on the ceiling*

7 *Lay the first fold of paper against the chalked line and smooth it out before applying the second and subsequent folds*

8 *Smooth the paper out as you go, expelling any air bubbles and always keeping the support parallel and close to the ceiling*

the edges to expel any air bubbles under the surface (fig. 7).

Make sure this first fold is running true to the line and then release the next fold and smooth it out in the same way (fig. x). Any adjustments which are needed should always be made with the flat of the hand—never use fingers as the concentration of pressure may tear the wet paper.

When you have applied a few folds of paper, you can move around so that you are facing the roller and the folded paper. Walk along the platform, slowly releasing the folds and brushing them in to place (fig. 8).

Continue hanging the paper in this way until the whole length has been pasted up. The surplus paper can now be trimmed off allowing 5-10mm to remain hanging down the wall. This makes for a cleaner finish when the walls are papered. If you are papering up to coving, crease the paper against the edge to make a cutting guide, then trim off the excess.

Paste and fold subsequent strips in the same way as the first, applying them to the ceiling and using the edge of the previous strip as the guideline. Take care not to overlap the strips—they should only butt tight up against each other.

To get a really neat finish and to ensure that the edges are well stuck down, use a seam or angle roller on the joints. The joints should be rolled after the paste has set—say every four lengths of paper.

The full face of the roller should not be used on embossed paper as the pressure will flatten out its design. Instead, use the edge of the roller directly on the joints.

Lights and chimney breasts

The paper will need to be cut so that it fits round obstructions such as light fittings. If the fitting is near the edge of a strip, you can cut from the edge of the paper inwards to the centre of the fitting (fig. 9). Make a few cuts outward to form a star pattern and press the paper over the fitting (fig. 10). Thread the loose electrical flex through the hole and smooth down the rest of the strip. Trim off the excess paper with a sharp knife.

Where the fitting comes in the centre of a strip, poke a hole through the paper with your scissors. Make star-shaped cuts outward from this point and finish off as above.

The other awkward spot when papering is around the chimney.

How you paper around a chimney breast depends on whether it is parallel, or at right-angles to, the direction of the ceiling paper.

When the chimney breast is at right-angles, make a cut along the length of the strip—equal to the depth of the breast minus the usual 10-15mm overlap—and smooth the paper in to the corner. Repeat this process on the other side of the chimney breast.

If the chimney breast is parallel to the direction of the ceiling paper, smooth the paper right in to the corner (fig. 11). This makes a crease mark indicating the depth of the chimney breast on that strip of paper. Crease another mark at the point where the side wall of the chimney breast and the ceiling meet.

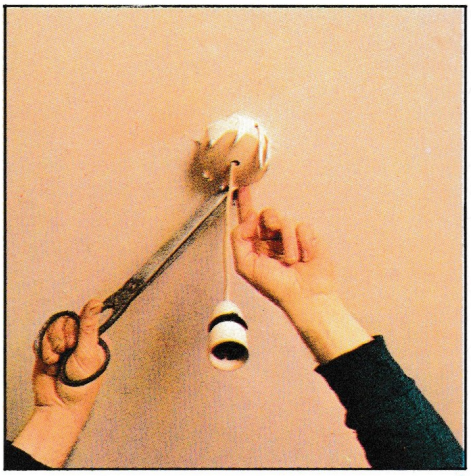
Next, gently peel the strip back from the ceiling and cut down a line connecting the two creases. Replace the strip, checking as you smooth it down that the other side is lined up with your chalk line or correctly butted against the adjacent strip further out in the room.

As you continue along the face of the chimney breast, leave the excess paper to hang down the wall (fig. 12). When you get to the other edge, make a cut upwards from the wastepaper edge of the strip. You can now smooth out the rest of the strip over the ceiling and trim in the usual way.

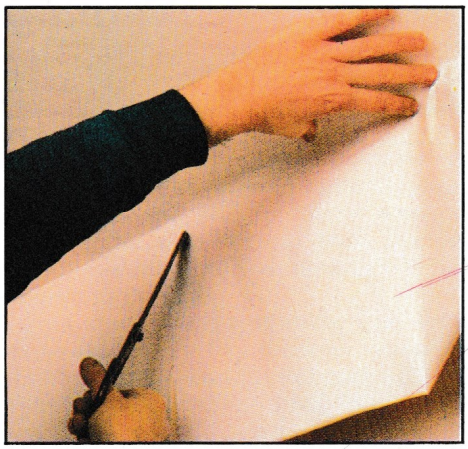
The final strip

The final strip of paper will almost certainly be narrower than a standard width. If this is the case, you will find it easier to hang and trim if the piece is measured and cut to size. Allow about 50mm extra of the strip then paste, fold and hang it as above.

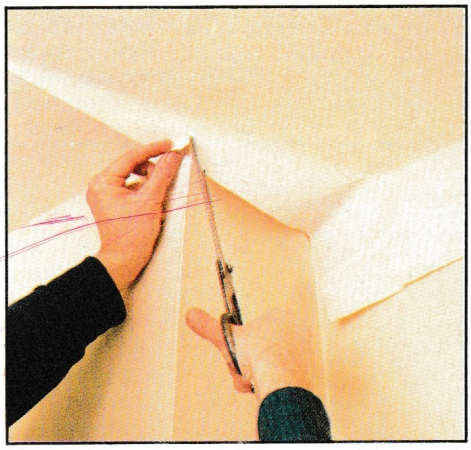
9 *Mark the position of the light fitting with your fingers and cut in from the edge of the paper towards the centre of the fitting*



10 *Make a few cuts outwards to form a star pattern which can be pressed round the fitting, and then trim off the excess paper*



11 *At the corner of the chimney breast, press the paper into place to make a mark and then peel it back so that it can be cut*



12 *The last cut should be a 'V' shape up as far as the mark to enable the rest of the paper to be pasted down the side of the chimney*

Liven up your ceilings

There is no reason at all for ceilings to be the most boring aspect of any room. Imaginative use of borders and bold patterns can liven up even the most bland ceiling.

The sunburst design **(below)** needs to be carefully marked out and masked off with tape after the ceiling has been given an all-over coat of paint.

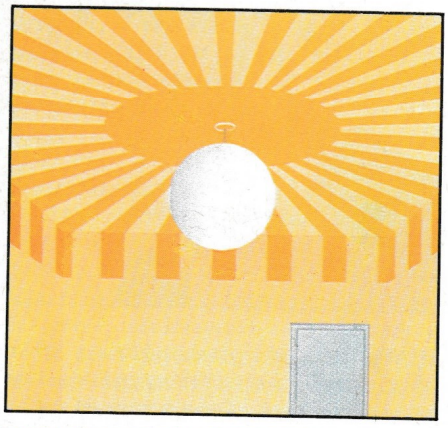
To draw the circle in this design, you need a length of string and a piece of chalk. Tape the string to the centre of the ceiling rose and, with the chalk in the same hand, stretch it taut to the edge of the circle. Move slowly round until you have chalked a complete circle, keeping the string taut at all times.

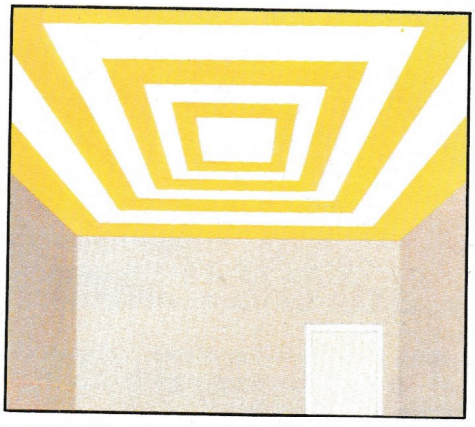
The geometric design of the ultra-modern room **(right)** is composed of painted lines and a border paper. A novel way of creating impact on a ceiling this also harmonizes neatly with the rest of the room.

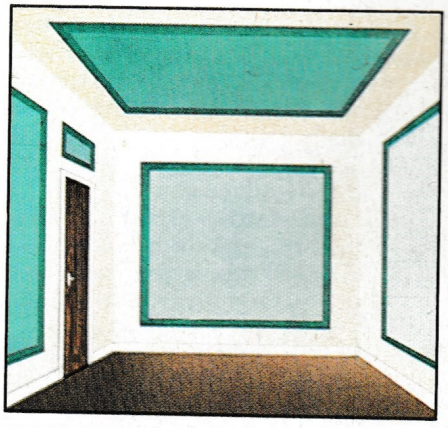
Diminishing squares **(below, centre)** can be laid out either with different coloured paints, or plain and patterned borders. The same is true of the matching squares on the ceiling and walls **(below right)**. In both cases, however, the effect is probably easier to achieve with wallpaper and borders as no masking off is involved.

All plain white ceiling paper should have at least one coat of paint to prevent it yellowing, which gives you an ideal opportunity to make it just that little bit different from the norm.

Elizabeth Whiting







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Contents so far

Home designer
Lighting for living rooms 4
Project: Make your own side lamps
Make the most of your windows 37
Project: A simple Roman blind
Bathroom problems solved 65
Project: Space-saving storage
Planning a kitchen 100
Project: Flap-down table
Choosing colour schemes 126
Project: Mix and match
Using mirrors 149
Project: Feature wall mirror

Project
Custom-built bedhead 10
Shelves with a difference 56
A simple sofa 78
Glamorous make-up unit 106
Versatile coffee table 138
Simple security 160

Repairs and renovations
Facelift for furniture 16
Project: Stencil magic
Gutter repairs 60
Repairing skirting boards 142

Masonry course
1 Basic bricklaying 20
Project: Build a barbecue
2 Simple foundations 88
Project: A stepped planter
3 Building a quoin; bonding patterns 132
Project: An open bond wall

Plumbing course
1 Understanding your water system 26
Project: When a pipe bursts
2 Working with copper pipe 50
Project: Fitting mixer taps
3 Using a blowlamp 171
Project: Install an outside tap

Decorating course
1 Decorating with tiles 30
Project: Stylish tiled worktop
2 Wallpaper without fuss 82
Project: Ideas for wallpaper borders
3 Painting interior woodwork 110
Project: Designs for doors

Carpentry course
1 Squaring up, sawing and sanding 44
Project: Indoor/outdoor suite
2 Nailing and screwing 72
Project: Build a bunk bed
3 Gluing and cramping 93
Project: Simple picture frame
4 The art of planing 165
Project: Build a toy truck

Heating and ventilation course
1 Heat-loss through the roof 116
Project: Insulate your loft

Plastering course
1 First steps in plastering 156
Project: Mending a large hole

Home electrics course
1 Electricity in the home 121
Project: Mend a fuse and wire a plug

Acknowledgements

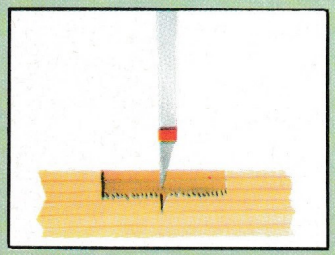
Pages 180-181 Green storage units: Wallpaper from Habitat; lamps and china accessories from John Lewis, Oxford St., London W.1; plant holders and stationery from Treasure Island, Pimlico Rd., London SW.1
Cream storage units: Towels, glass bottles and picture from John Lewis; bathroom accessories from Treasure Island; wallpaper from Laura Ashley, Sloane St., London SW.1
Pages 188 and 193 Wallpaper and carpet from Arthur Sanderson and Sons Ltd., Berners St., London W1A 2JE
Pages 200-204 Arthur Sanderson and Sons

Where to buy it—UK

Space-saving hi-fi unit Pages 188-193
Advice on buying veneered chipboard from: Chipboard Promotion Association Ltd., 7A Church St., Esher, Surrey KT10 8QS

Bending copper pipe Pages 194-199
Copperbend flexible pipe from: UCAN Ltd., 11, Old Esher Rd., Hersham, Surrey
Advice on buying copper pipe from: Copper Development Association, Orchard House, Mutton Lane, Potters Bar, Herts. EN6 3AP

In next week's issue



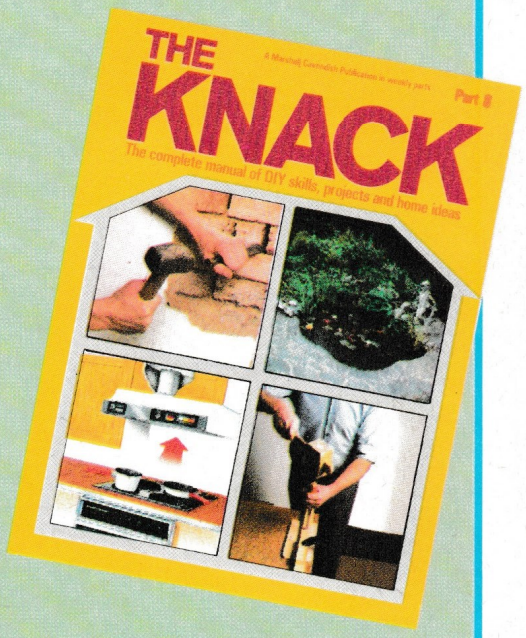
Floor treatments: Floors can make or break a room—no matter how well it is decorated. Home designer goes through the various coverings and treatments available and shows you how to make a something-out-of-nothing rag rug.

A garden pond: Just the thing to add an exciting focal point to your garden, our featured project is simple to construct and can be adapted to suit any surroundings

Kitchen ventilation: If you are fed up with clouds of smoke and steam in the kitchen, the second part of our Heating and ventilation course should be able to help. And on the practical side, we fit an extractor fan.

Knocking holes in brickwork: This is a job which contains plenty of pitfalls to trap the unwary. We show you how to tackle it with confidence and make the most of your skills by fitting a serving hatch.

The art of chiselling: Difficult to perfect but well worth the trouble, we take you through this basic carpentry skill in step-by-step detail and give plans for a jewel box.



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